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soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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SOILS AND WOODLANDS

Soil maps for planning
Wood products and jobs
Soil-site index studies

Public land laws

Rural beautification

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: When this country was settled, the forest growth was an indication of the potential of the soil for other crops. Mixed hardwoods—oaks, yellow poplar, walnut, and hickory—were first choice.

Focus on soils . . .

The Third North American Forest Soils Conference this month focuses the attention of the forestry profession on an important, and until lately largely ignored, sector of its concern.

Several months ago we asked SCS Head Forester C. T. "Cap" Prout to explore for our readers the significance of soils to woodland conservation and management.

The response of fieldmen to his query shows that the use of soil information for woodland planning has reached a high state of development in SCS.

The soil and woodland team of John Gorman and Ross Mellinger, for example, list many ways (p. 3) that West Virginia woodland owners rely on soil information.

Cap Prout's own account of soil-site index studies led by SCS (p. 7) establishes the scientific basis of the resulting technical guides.

Returns: The large economic benefits that stem from sound woodland management tailored to soil potentials are demonstrated in two contributed articles from Louisiana (p. 5) and Montana (p. 9).

Both make it plain also that agency cooperation is an essential element of such success stories.

Public land: Woodland owners and foresters, among others with a special interest in the relation of public lands to the private economy, will appreciate Ed Kerr's inside account (p. 15) of the work and plans of the Public Land Law Review Commission.

soil conservation

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ORVILLE L. FREEMAN, Secretary of Agriculture

JOHN A. BAKER, Assistant Secretary of Agriculture

DONALD A. WILLIAMS, Administrator, Soil Conservation Service

BEN O. OSBORN, Editor

GEORGIE A. KELLER, Production Editor

Prepared in the Division of Information, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C. 20250

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A soil scientist-forester team takes tree measurements to determine site index for oaks and yellow poplar and records soil characteristics on Shelocta silt loam. At right, Moshannon silt loam, a deep, fertile, well-drained soil, was excellent for the black walnut, which is just 1½ years old. Soil maps are good guides to selecting the kind of tree to fit the soil.

**By John L. Gorman
and Ross H. Mellinger**

*Soil scientist and woodland conservationist,
SCS, Morgantown, W. Va.*

Fitting the tree to the soil

West Virginia woodland owners find soil maps helpful in planning reforestation and answering management questions

Private owners, both individual and corporate, own 91 percent of West Virginia's 11 million acres of forest land. The needs and objectives of the people who own and operate woodland are as varied as their tree crops and the soils on which they grow. For example:

A small Appalachian farmer wants to start a new woodlot on a steep, eroded pasture field. What tree species will heal erosion the quickest and produce a crop of wood while doing it? What soils on the farm are best suited for cash crops to bring in income while the trees are growing?

An owner of 5,000 acres of mountain forest land wants to go in for timber growing and recreation on his land. He wants to know what parts of his tract are best suited for each use.

A large wood-using industry acquires abandoned farmland for a tree farm. Which soils should be managed for hardwoods? Which for pines? How much of the land can be operated with large machines?

A logging contractor is going to bid on a timber job. Will the soils support his heavy equipment all year or will he be shut down part of the time when winter sets in?

An investor in timberland has a tract in mind. He wants to know the potential growth and yield for hardwoods under good management so he can estimate probable earnings on his investment.

Help in answering these ques-

tions and many more can now be had from soil surveys. The surveys, made by the Soil Conservation Service in cooperation with the West Virginia Agricultural Experiment Station, now cover over half of the Mountain State. On this land it is now possible to learn much about tree growth and forest-management problems from the soil maps and the interpretations that go with them. For tree farmers and foresters, they are like road maps showing the route to follow.

There are well over a hundred different soil series in West Virginia. Individual soils may be shallow, others may be deep. Some are sandy and loose, others are clayey



and sticky. Soils with similar properties are given the same name wherever they occur. They are commonly named after a county or town where the soil was first mapped or described, such as Wheeling, Huntington, or Lindside.

Soil classification

Since soils are classified and correlated within a nationwide system, information obtained in one place is applicable in another county or state within the same climatic area on the same soil. This makes it possible to exchange and use data over a wide area.

In West Virginia, SCS uses a soil scientist-forester team to relate tree growth to kinds of soils. Site index, a gage for potential yields, is measured and recorded for common indicator crop trees (like oaks) growing on named kinds of soils.

The soils are examined and described. Features such as associated tree and shrub species, aspect, slope, elevation, and ground cover are recorded and used to help develop other soil-related forestry information. These data furnish a basis on which such things as species suitability, erosion hazard, equipment limitations, competition from

undesirable plants, seedling mortality, and windthrow hazard can be predicted for each kind of soil.

SCS soil scientist-forester teams analyze the tree measurements and soil properties. They find that certain soils grow trees quickly while others grow trees very slowly; that certain tree species commonly occur on some soils and not on others. They also discover that there are wide differences in woodland-management hazards, such as danger of erosion and limitations on the use of equipment. These differences are described by rating soils as having slight, moderate, or severe limitations for each item considered. By comparing these ratings, they find which soils have about the same effects on tree growth and woodland operations. Soils similar in their effects on tree growth and management are placed together in "woodland suitability groups."

Technical guides

This information is incorporated into SCS technical guides and published soil surveys. This allows soil maps to be interpreted for woodland owners who want to know more about the suitability of their soils for tree farming.

Woodland interpretations can

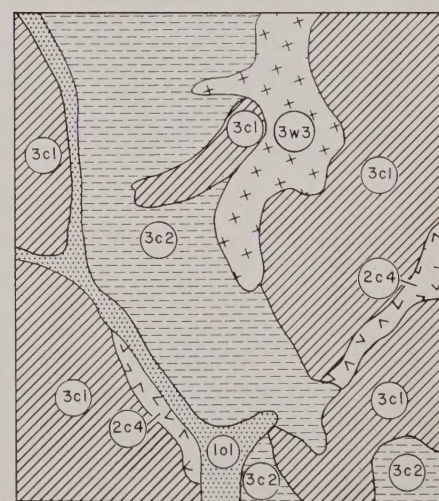
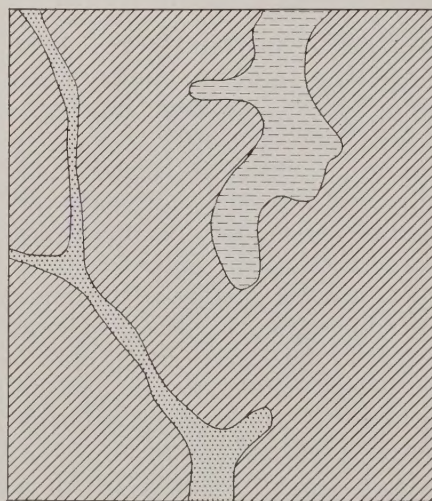
take several different forms. The most commonly used one shows soils combined into areas of similar woodland suitability. These areas are made up of soils which have similar effects on species suitability, tree growth, and management. A legend for such a map would briefly explain the following items for each area: Potential productivity for the commercial tree crops common to the soils; tree species preferred for managing in natural stands or for planting; and all of the soil-related hazards and limitations that are locally important.

Another kind of interpretation shows a specific management hazard or limitation, such as restrictions in the use of woods equipment. This kind of interpretation can be shown graphically as a colored overlay of the map. A legend explains the map in terms of colors which denote slight, moderate, or severe limitation.

Other specific soil map interpretations important in woodland management are those for woodland site quality, species suitability, plant competition, and erosion hazard. Interpretations are selected to meet the specific needs of the woodland owner or forester.

Foresters who are concerned with

Left, the basic soil map delineates areas of each kind of soil. The figures and letters comprise symbols that record the kind of soil, steepness of slope, and degree of erosion in each area. A single-factor interpretive map shows the limitations of each soil for a particular feature; in this case, hazard to use of equipment: dotted hatchure, slight; horizontal, moderate; oblique, severe. Right, another interpretive map shows areas of similar woodland suitability. The first number of the three-part symbol in a nationwide system indicates productivity; the small letter tells the main soil property that causes problems; and the third number identifies the woodland suitability group.





A landowner (left) in the Upper Ohio Soil Conservation District, Neil Aberregg, studies the soil map of his land with Soil Conservationist Noel Cochran and County Forester Frank Vance.

managing large tracts of land find soil maps to be useful tools in developing management plans. The maps help them decide on the most promising commercial species to manage on each soil.

Conservationists and foresters can make preliminary judgments on the feasibility of planned cultural work needed to improve growth or quality of tree stands. They can predict frequency of thinnings and intermediate cuttings (cutting cycles). They can determine the most economical crop tree size to grow on each kind of soil. They can decide on the kinds of equipment needed in cultural and harvesting work and where to build roads for skidding and hauling.

Soil maps have become a valuable part of the professional forester's "kit of tools." One of them said recently, "Look down at the soil, not up at the trees if you really want to tree farm." ♦

Paper company puts soil information to work to grow trees and keep people in jobs

By H. Ford Fallin and Lester L. Loftin

Woodland conservationist and assistant state soil scientist, SCS, Alexandria, La.

The use of soil surveys in managing timberland helps to grow trees that keep 800 people working in the Calcasieu Paper Company plant at Elizabeth, La.

Payrolls amount to more than \$5 million each year. In addition, income is provided to about 400 people who cut and haul pulpwood to the plant.

Paul W. Wright, who manages Calcasieu's Wood and Land Department, says that the paper company spends more than \$3 million a year for timber, timberland leases, and forest developments.

The company's 75,000 acres in southwest Louisiana is under conservation agreement with the Calcasieu Soil and Water Conservation District. The first agreement on a 7,000-acre tract was signed in 1958.

Between 1961 and 1967 an additional 64,340 acres of leased land was added to the agreement.

Soil survey information was used in developing management plans for the entire area and in acquiring new timber-growing lands.

Management of the timberland is started by dividing it into 160-acre compartments, each to be handled as an even-aged unit. Soil Conservation Service people in Oberlin and DeRidder helped to interpret soil surveys which are used for guidance in the long-range woodland conservation plans.

"The main objective of our company is to grow timber for our mill," Wright explains. "We are using the even-age management system to give us uniform sized trees that will permit a high degree of mechanization in harvest.

Manager of Wood and Land Department of the paper company, Paul W. Wright (right), examines soil sample dug by SCS Soil Scientist Lester L. Loftin.



"Our plans call for an orderly harvest of existing timber, cutting the poorest compartments first. These clear-cut compartments are then promptly reforested. One or two thinnings will be made between 15 and 25 years of age. A final harvest cut is planned at 30 to 35 years.

"A soil survey is valuable to our company in many ways. One is that it shows how fast trees can be grown. This governs the amount we can afford to spend when acquiring and developing land. Further, it indicates the most suitable kind of trees and influences the method of reforestation we select."

Other uses of surveys are to determine the size and location of areas needing drainage and to show the degree of equipment restrictions during planting, crop tending, and logging operations.

Wright points out that the soil determines the species of trees they choose to plant or manage for an area: Creek bottom sites are best suited for loblolly pine and hardwoods; poorly drained upland sites for slash pine. Well-drained uplands are suited for both loblolly and longleaf pine, he said.

Wright recalled that in one of their early operations he used the soil survey to locate 3,500 acres of high-quality land along Ten Mile



Manager Wright (right) considers some points in the conservation plan with SCS Work Unit Conservationist Jack R. Cutshall. To the left of the fire-break in the background is a 6-year old slash pine plantation.

Creek. The area was clear cut and promptly direct-seeded to loblolly and slash pines. Competing brush was controlled with chemicals applied by mist blower and injectors. This was a new technique that gave a full stand on about 70 percent of the area at low cost. He added that knowledge of the soils and good timing contributed to the success of this technique.

On another tract, the soil survey outlined 20 acres of high site potential but was subject to seasonal

flooding. A drainage ditch, costing about \$200, was constructed to drain off the surface water. The area reseeded naturally and is now fully stocked with loblolly pine. This good land, with a high site potential, capable of producing two cords of pulpwood per acre per year, was reclaimed for a cost of \$10 an acre.

Wright said, "We are working out grazing leases with local cattlemen. Grazing is a secondary land use for us. It helps to pay taxes, reduces the fire hazard, and provides additional income to the local community. We are also interested in developing hunting and recreation uses."

The Calcasieu Paper Company has been in operation at Elizabeth since 1926. The mill is operated 7 days a week and uses 500 cords of wood a day. Only 20 percent of the mill's wood supply comes from company land. The six foresters in Calcasieu's Wood and Land Department are using every means available to develop a permanent pulpwood supply for its mill and to help the economy of the area by establishing full stands of desirable trees as rapidly as possible.

Soil "know-how" is helping do it. ♦

Pulpwood being unloaded at the Calcasieu paper mill.



Woodland site index ratings of soils

By Carrow T. Prout, Jr.

Head forester, SCS

Using plants, including trees, as indicators of soil productivity and quality is not new. Man has probably associated natural vegetation and soil potential since the dawn of civilization.

When this country was first settled, the forest growth provided an indication of the potential of the soil for other crops. In 1842, Edmund Ruffin, editor and proprietor of the *Farmers Register* in Petersburg, Va., told his readers what to look for in selecting land to farm:

"In conclusion, we would say, if land in the interior is wished, make poplar and walnut the first trees to be sought for. If you cannot get land with these—look for ash-magnolia-sassafras of large size—beech or large sized white oaks. As a third choice take land with large red oaks and hickories.

"... and leave as the last chance such spots as grow no other tree (pine), particularly if they are small."

The search for a better knowledge of soils began long ago; it continues today. Late in the past century scientists began classifying soils, naming and describing them in terms of their characteristics and genesis. Then the art of mapping soils—showing their extent and location on a map—was developed. Interpretations then could be made showing the suitability of named soils for growing trees, cultivating crops, and many other uses.

One of the early kinds of interpretations was a system of classifying soils according to use capability described in USDA Miscellaneous Publication 352, *Soil Conservation Survey Handbook*, by E. A. Norton, in 1939. Later, in 1961, *Land Capability Classification*, USDA Agriculture Handbook 210, by A. A.

Klingebiel and P. H. Montgomery, documented an improved version that is still used by SCS.

The land-capability classification was developed mainly to simplify detailed soil information for use with common cultivated crops and as a tool for broad general land use planning. Some conservationists at first viewed it as a universal tool, a panacea, for simplifying detailed soil information for many uses. Arguments were many—that class I land was the best forest soil, class VII the worst, and the like. And there were those who thought otherwise.

Soil-site index correlations began because of such discussions. Studies relating soils and tree growth were begun in the Pacific Northwest in 1945 under the leadership of Theodore B. Plair, then regional forester there for the Soil Conservation Service. The results firmly established that there is a definite relationship between the kind of soil as mapped by the soil scientist and the growth of trees.

Plair moved to the Southeastern region of SCS in 1953. There with Dr. T. S. Coile of Duke University, who had done much research in forest soils, as a consultant, he initiated similar studies of the correlation of soils and site quality.

About the same time, Dr. Earl L. Stone, Jr., of Cornell University, assisted in organizing SCS efforts in the Northeast, working with A. C. McIntyre, SCS regional woodland conservationist.

When Plair came to Washington in 1954 as head woodland conservationist for SCS, he worked closely with soil scientists to unify the soil-woodland correlations in the Nation. Dr. Paul E. Lemmon gave leadership in the Soil Survey Inter-

pretations Division in developing and coordinating the national system.

Soil-woodland correlation studies seek to determine the average site index for each important species of tree on major soil series. For example, loblolly pine is a common tree on the Norfolk series in the Coastal Plain from Virginia to Mississippi. It is now known that wherever loblolly pine grows on Norfolk fine sandy loam it has a site index of about 80. This figure expresses the correlation that exists between Norfolk soil and the site index of loblolly pine.

Site index is a measure of the potential growth of a tree species on a specific site, expressed as height at a given age. The height growth of trees is regular and predictable and is not affected by available growing space except in overcrowded or very open stands. In normal stands the height of a tree, at any known age, is a reliable indication of the ability of trees to grow on the site.

Furthermore, research has provided detailed information relating site index at different ages to volume units of growth and yield for specified kinds of forests growing under described conditions. Average site index of a soil for a specified tree then becomes a quantitative prediction of productivity.

In the United States east of the Rockies the height of a tree at 50 years of age is most commonly used as the site index. In the Rocky Mountains and west the height at age 100 is used for most species.

To correlate soils and site index for the many kinds of soil and many species of trees across the Nation is an enormous job. A study of this kind requires uniformity and

teamwork. Foresters and soil scientists must work together.

The plots, or places for making the measurements, must be carefully selected. Each soil must be typical of its kind, "modal" or within the central concept of the range of characteristics as defined for that soil. The trees must be of the desired species, they should be "middle age," neither too young nor too old, and must have been free of any growth retarding or damaging influence during their life. The trees must have been in either a dominant or codominant position throughout the life of the stand.

Measurements are made carefully. Pits are dug so that the soil features are visible and can be examined, measured, and recorded. The ages and heights of the trees are carefully determined with instruments designed for these purposes. All measurements are recorded.

At least five plots are selected and measured for each tree species or forest type being studied on each kind of soil. As the work progresses, the plot data are summarized and analyzed. Tests of reliability are made. If the standard error is more than considered desirable, more plots usually are selected and measured to determine the cause of variation. When observations for a specific soil continue to give a wide range of site quality, it may be necessary to examine the soil more closely. In some instances a new series or soil phase has been set up to give the needed reliability to the correlations and to make the soil map more meaningful for woodland use.

To date, within the United States, soil-site index measurements have been made on more than 22,000 plots. This involves approximately 2,900 different kinds of soil, 24 species of trees or forest types, and measurements of more than 77,000 trees.

Federal and state agencies and colleges and universities for many

years have been studying the effect of different soil characteristics on growth of trees. Such factors as the depth of the soil, available water capacity, texture, organic matter, chemical composition, and many others have been studied individually and collectively.

These have been helpful in understanding the relative importance of major soil characteristics. But these factors do not affect tree growth independently of each other. Their combined effects in soils that are identified and named on the soil map are a better basis for soil-site index correlations.

The Soil Conservation Service has followed the latter approach. And it has worked in cooperation with other Federal and state agencies, universities, and forest industries. In many states, SCS describes the soils while foresters of the state forestry agency or of forest industries obtain the tree measurements and vegetative information.

As this vital work continues, as the volume of data increases, and as the demand for the information grows, manual summarization, analysis, and interpretation become more and more difficult. So SCS is turning to the computer for electronic storage and retrieval of all correlated soil-woodland interpretative data.

As these measurements are made and correlated with kinds of soil, the results are published and made available for foresters and land managers who need and use such information. The first progress reports were issued in 1959 on "Soil Survey Interpretations for Woodland Conservation—Forested Coastal Plains, Arkansas" and "... Western Louisiana." Recent soil surveys of areas where woodland is important have sections devoted to the woodland interpretations. Also, current information is available in SCS technical guides for the use of SCS personnel in advising land owners and operators about the potentials of their land for growing adapted trees. ♦

Community effort solves playground problem

“The best cover of grass I’ve ever seen on a school yard,” recently remarked Irwin S. Maddy, superintendent of Summers County, W. Va., schools.

Results of cooperative community efforts involving the Lilly Heights Parent Teachers Association, Summers County Board of Education, and the Soil Conservation Service, precipitated the comment.

The project began when the Board of Education, a cooperator with the Southern Soil Conservation District, wanted grass to grow on the barren playground at the grade school. For many years, children came home either dusty or muddy, causing parents to voice concern about the condition of the grounds.

The board planned to supply the seed, lime, and fertilizer; members of the local PTA, the labor and machinery including the tractors, plows, disks, rakes, and shovels; SCS the technical assistance, with work to begin at once; and the soil treatment material and Kentucky 31 fescue to be purchased from a local feed dealer. A planned diversion would intercept the surface runoff.

On a morning in May the work began. The diversion was shaped while a seed bed was disked from the hard soil. Workers raked off stones and leveled rough spots. By evening the job was complete.

In spite of one of the driest of summers, September saw a beautiful lush stand of fescue.

The result, children’s clothes and shoes are staying clean, thanks to a community that plans and works together.—ROBERT A. SPEICH, *work unit conservationist, SCS, Hinton, W. Va.* ♦

Since 1961, a sawmill in western Montana has paid some 60 to 70 local soil conservation district cooperators more than \$1 million, most of it for small timber with no previous market. At the same time, the company has employed 20 to 30 local part-time farmers to operate the mill.

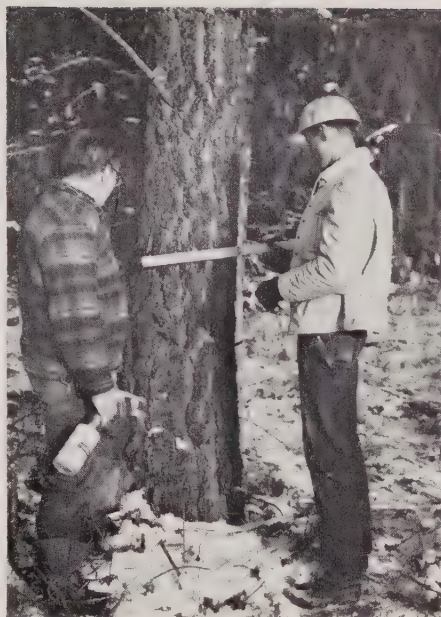
The wood products industry is one of many benefits coming out of woodland conservation improvements performed by cooperators in the Green Mountain Soil and Water Conservation District. The improved economy is felt in all parts of the county.

The growth and success of this woodland project was, in no small measure, due to the excellent working relations between cooperating agencies and the district. The Soil Conservation Service and the Montana Office of State Forester each provided one member of the woodland planning team. Both men are headquartered at the Soil Conservation Service office in Plains. They work together, share equipment and tools, and provide timely and efficient service to the cooperators.

The result is a marked increase in people who request and receive help in thinning young woodland stands and in proper harvesting and slash disposal of mature stands. Reforestation has gained more attention, and the trees respond quickly to good growing conditions under woodland management.

In 1961 the district helped Durable Wood Products Company build the sawmill at Trout Creek. Cooperators were encouraged to harvest and market their stagnated stands of lodgepole pine, western larch, and Douglas fir.

Donald G. Naegeli, chairman of



Montana forests respond to agency teamwork

By Charles E. Wright and George H. Gable

Office of state forester, Missoula, and woodland conservationist, SCS, Bozeman, Mont.

the district board of supervisors, calls this the "first phase" of their woodland improvement program.

All this started when the district supervisors consulted with A. B. Linford, SCS state conservationist, and Gareth C. Moon, Montana state forester, on ways to improve woodland assistance. As a result, Linford and Moon agreed on working relationships and how cooperation could best be achieved.

Members of the woodland planning team compare work schedules to assure efficient use of time and travel. They agree on joint use of technical guides, procedures, and working tools. Both foresters promote the district's entire program on all fronts as they go about their work. They work as a team, whether together or alone, and the cooperators receive one conservation plan that combines the wood-



Above, Craig Roberts (left), service forester for Montana office of state forester, and Gary Gebhart, SCS aid, cruise and mark timber for the owner according to a woodland management plan. At right, Cary Hull (left), SCS woodland conservationist, and Craig Roberts (right) help Don Naegeli scale logs on his farm.

land management features with all other decisions on use and treatment of their land.

The district is now engaged in "phase two" of their woodland effort to meet recent changes in woodland use. Newcomers to the area are buying small woodland tracts; some for speculation, some for recreation developments, and others just to own and retire on a handsome piece of land covered with a growing forest.

To fulfill the district's obligation to these people, the supervisors

have asked the State Extension Service to help them develop a door-to-door canvass of the woodland owners. They hope to interest the new owners in their woodlands and determine the kind and amount of assistance the people want and need. The people are being asked for their ideas and proposals to promote farm forestry activities. When the results are summarized, the district will be still better able to make full use of the woodland assistance provided by the two cooperating agencies. ♦

Fire suppression lanes are more than firebreaks

Firebreaks in the Central Spokane Soil and Water Conservation District, Wash., are being built as fire suppression lanes.

They are laid out and constructed so they can be used as roads to get fire equipment into any area of the woodland and are the basis for ACP cost-share payments.

In 1966, 2½ miles were built; in 1967, 4 miles; and for 1968, 15 miles of lanes are planned.

With technical help from the SCS, District Cooperator Walter Scott constructed 7,300 feet of fire suppression lanes in 1967 on his 90 acres of woodland.

Aerial photographs helped Scott and the soil conservationist decide where the lanes should be built. They ran the proposed route of the lane with a hand level, compass, and 100-foot chain; used color flagging to mark the route for the equipment operator, and recorded, plotted, and marked direction and distance in Scott's conservation plan folder.

To make all the woodland accessible to fire-fighting equipment, they found that lanes were needed on slopes of up to 40 percent. As the route was laid out, they avoided steep grades, put in a few short

steep pitches where topography required it, constructed water bars to prevent the land from eroding, and sloped roads to the downhill side to prevent building up a large head of water that would cause serious erosion. They kept to a grade of 6 percent or less where possible to cut construction and maintenance costs. The width of the firebreaks was 10 to 12 feet.

Construction of the firebreak was done by a local contractor at a cost of \$0.03 to \$0.05 a foot, depending on the type of soil and the quantity and size of trees to be removed. A good operator, using a crawler-type tractor with a 12-foot angle blade, can complete 300 to 400 feet of fire lane an hour.

Already the new fire suppression lanes are being used for more than access in case of fire. They make for better management, since other woodland practices, such as thinning and pruning, are now feasible. Small saw logs have been taken out in a small timber sale. The woods can now be used for the enjoyment of Walter Scott's children and grandchildren. He plans to build a pond to add more value to his woodland.—GARY R. NORDSTROM, forester, SCS, Spokane, Wash. ♦

Conservation district sets up woodland contractor

The Pope County Soil and Water Conservation District in west central Arkansas now has a contractor doing timber stand improvement work that is helping meet a conservation need and providing full-time employment for the operator and two helpers.

Noting that the Conservation Needs Inventory showed several thousand acres of woodland in the district needing timber stand improvement, the district supervisors talked to several prospective contractors. They located a young man, Leroy Phillips, who had been working in timber for several years and seemed suited for this work.

The supervisors offered to sell Phillips tree injectors and herbicide on credit and to write letters to woodland cooperators telling of his services. They also arranged for news articles to promote timber stand improvement.

Local SCS conservationists gave Phillips technical instruction.

The supervisors urged him to apply to the ASCS office for recognition as a vendor, so cooperators could have work done with a small outlay of cash.

Soon Phillips realized he needed better transportation. He was advised to see County Supervisor A. D. Robins, who assisted him in securing an economic opportunity loan from Farmers Home Administration to buy a new pickup truck.

Leroy Phillips has been so successful that he has repaid the Pope County District for the injectors and herbicide, and results of the district's efforts are evident in 1,200 acres of woodland where he has done timber stand improvement.—FRED J. WILLIAMS, woodland conservationist, SCS, Russellville, Ark. ♦

The landscape of Hardin County, Ohio, is typical of that found over most of the northwest quarter of the state. The relief is flat, tree cover is sparse, one can see for miles, and the winter winds swoop low across the naked fields.

This is farm country!

In the beginning, Hardin County, like most of Ohio, was covered with forest. The early settlers, who began to arrive soon after 1800, found the heavy timber an obstacle to their survival. Clearings were needed to produce vital food crops. By midcentury the deforestation process was well advanced.

Today there is evidence in Hardin County of a reversal of this trend. Cooperators with the Hardin County Soil Conservation District and other landowners are now planting more and cutting less, around the farm buildings at least.

A sturdy 110-year-old planting of eastern redcedar now protects the Hubert Slessman farmhouse from the prevailing south and west winds. We can only conjecture what might have motivated the owner of this farm in 1858 to make this planting. We can wonder why these trees were planted in a fashion so similar to the way we design windbreak plantings today.

By the 1880's and 1890's tree planting activity around Hardin County farmsteads was on the rise. Plantings of 70- to 90-year-old Norway spruce are much in evidence today in the county and throughout northwest Ohio. Also in this area we find Scotch pine, eastern redcedar, and catalpa, all of about the same age as the spruce.

Farmstead tree plantings in this area continued, but on a limited basis, into the present century. In the mid-thirties the conservation movement rekindled an interest in tree planting, both of forests and windbreaks.

Typical of many such plantings, the Jeanette B. Davis windbreak has seven rows of Norway spruce. This is more rows than now considered necessary but the trees are



Delno Cooney inspects his 8-year-old, 5-row windbreak of white pine and Norway spruce.

Trees against the wind in Ohio reverse pioneer trend of forest clearing

vigorous and give excellent protection to her 2-acre farmstead, about a mile north of Ada.

The Charles Smith farmstead, 3 miles north of Kenton, has been protected for years by a three-sided Norway spruce windbreak planted in 1938. Mr. Smith admits that his windbreak came about by happy accident; he had intended to raise Christmas trees, but they "got away from him." Now he wouldn't trade for a whole field of Christmas trees. Smith claims that his winter fuel bills have been reduced an equivalent of about \$50 a season.

In 1954 John Deal planted a three-row windbreak, 300 feet long, along the westward side of his farm home. The planting consists of Norway spruce, white pine, and red pine on a Morley series soil. The location is about 7 miles southwest of Kenton. The white pine in this instance is the tallest, having grown 18 feet in 14 growing seasons.

A younger windbreak is that of Delno Cooney, 8 miles west of Kenton, and planted in 1960. Mr. Cooney planted five rows of white pine, and, to leeward, one row of Norway spruce.

Harold Ault has a vigorous 4-year-old windbreak planting at his farm home 5 miles west of Kenton. Individual rows of Austrian pine, white pine, and Norway spruce are spaced at 10 feet apart. Trees are spaced every 10 feet in the rows with temporary "filler" seedlings placed half way between the permanent ones.

Landowners of all northwest Ohio counties who contemplate windbreak plantings are being encouraged to follow the guidelines for windbreak design developed by the Forest Service, Soil Conservation Service, the Ohio Agricultural Research and Development Center, Ohio Division of Forestry and Reclamation, and others.

Cost-sharing of up to 80 percent of the cost of fencing, seedling purchase, and planting has been a part of the ACP Program in northwest Ohio since 1966.

Ohio farmers have found that if a row of shrubs is added next to the windbreak trees, wildlife is benefited, beauty is enhanced, and the farm house becomes a happier home.—LEROY BOGER, *work unit conservationist, SCS, Kenton, Ohio.* ♦



A group of 4-H Club girls paint mailbox supports as their contribution to the Menominee rural beautification program. A group of 25 mailboxes on a 4-mile stretch of road got the treatment.

Below, dairy cows and stripcropping system on the Albert Delleis farm add beauty to the countryside. At center, a multiple-purpose farm pond provides water recreation for the family as well as irrigation for the garden and drinking water for livestock. The pond area has been attractively fenced and landscaped.



Action for beauty

By Allen C. Weber

*Work unit conservationist, SCS,
Stephenson, Mich.*

A landscape becomes beautiful when people care enough to do enough.

This simple truth has inspired a rural beautification program in Menominee County Soil Conservation District, Mich., that is attracting nationwide attention.

It began with a meeting in the spring of 1965 when Menominee County District directors and several other interested persons discussed how they could respond to Lyndon B. Johnson's challenge to "preserve and improve the natural beauty in America."

It was noted that eye-pleasing effects had been showing up wherever soil conservation practices



Michigan district adds extra touches to community's rural charm



A spring-fed pond on the Ray Linsmeier farm provides neighborhood recreation in well-kept surroundings.

were applied ever since the conservation district was established in 1944.

Thousands of acres of stripcropping on the glacier-formed drumlins provided interesting patterns on the rural landscape; tree planting had changed previously bare hillsides along the highways to scenic evergreen plantations; and waterfowl visited well landscaped farm ponds.

Soil conservation practices, intended for erosion control and good land use, had beautification as a byproduct. Someone labeled it a "fringe benefit."

This "fringe benefit" type of beautification was evident in many

parts of the district, but not everywhere. Much more needed to be done, especially along main highways traveled by thousands of tourists.

During the first summer there was much discussion and planning and also some visible signs that the program was effective.

The following spring, renewed emphasis and publicity resulted in individual, group, and community action. The county 4-H Club met with conservation district directors in a planning session, and the 4-H Clubs geared their program to landscape planning that included projects like painting all mail boxes and mailbox supports along a 4-mile stretch of county road.

The Gourley Township community group set aside 1 day to clean up yards and pick up litter along the road. Gourley Township had no garbage dump; the township supervisor was contacted about establishing one. This has now been done, and residents are urged to dispose of all unsightly litter there.

The Menominee County Farm Bureau gave public endorsement to the district's rural beautification program and urged members to cooperate.

The family judged to have contributed most to rural beautifica-

Three 4-H Club girls pause to admire the colorful crownvetch in bloom in a roadside erosion-control planting.



tion was honored by the Menominee County District at an awards banquet in the fall of 1966, when Mr. and Mrs. Anthony Jasper of Carney received an engraved pen set. The same family expanded its efforts to communitywide beautification in 1967 and received another award.

In its third year now, rural beautification is an important part of the district program. Directors plan a continued application of needed soil conservation practices, farmstead improvement, and emphasis on planting for esthetic as well as utility purposes.

The Soil Conservation Service plant materials center furnished Emerald crownvetch seed for trial in stabilizing difficult areas. Crownvetch had been tried earlier on a very small scale and seemed to have good possibilities.

A leveled borrow pit and several steep road cuts, all in the same vicinity, were seeded. The Menominee County Road Commission and landowners in the vicinity cooperated. District and SCS personnel did the planting.

There was a definite increase in numbers of farmstead and field windbreaks planted this year. Packages of mixed shrubs and trees to improve wildlife habitat were planted in odd areas.



Mr. and Mrs. Anthony Jasper, winners of the Menominee rural beautification contest, are congratulated by Lester Walcutt, 4-H Club leader.

County 4-H Clubs received a donation from the Sears Roebuck Foundation for landscape improvement. The money is being used to propagate shrubs and other plants for beautification purposes plus their use for erosion control and improvement of wildlife habitat. The planting program is due for expansion next year.

The beautification efforts drew the attention of two neighboring conservation districts last fall when local directors were hosts to direc-

tors and their wives from Iron and Dickenson districts. Visiting directors saw results of beautification efforts in five townships and have included rural beautification in their own programs this year.

Directors of the Menominee County District are confident that their program, which started with the "fringe benefits" of good soil and water conservation practices, will continue. The resulting benefit will have a lasting effect on a region of which they are justifiably proud. ♦

Standard soil conservation practices, such as this improved pasture, and beef herd on the Vincent Peterson farm, contribute to rural beautification.



Catfish farmers of America recently organized

A new society, the Catfish Farmers of America, has just recently been organized.

The officers of the society consist of Charles W. Pickering, president, Laurel, Miss.; Tom Pugh, vice president, Portland, Ark.; and Kenneth Coon, secretary, Tuckerman, Ark. There are also 11 directors from seven Southern States (Miss., La., Okla., Ark., Ga., Tenn., and Tex.) ♦

Laws and the public lands

By Ed Kerr

Information officer, Public Land Law Review Commission, Washington, D. C.

The 88th Congress in September of 1964 established the Public Land Law Review Commission and charged it to recommend a national public land policy for the future, after studying the whole gamut of public land uses and their relations with one another. Considering that the public lands cover one-third of the Nation's land area, such a study is momentous.

Some 2,700 public land laws are in effect today, some of which date back to 1790. It is possible that some of these statutes no longer serve the best interest of the Nation. They may be out-moded or in conflict with each other, or both.

It is the purpose of the commission to determine which statutes are obsolete or conflicting.

Some of the homestead laws, for instance, date back to 1862 when the population of the United States was less than one-sixth of today's total. The basic mining law of the Nation was enacted in 1872, and the reclamation act was passed in 1902.

Further complicating the problem is the fact that responsibility for administration of the public lands is divided among many agencies which have different regulations for the management of the same resources. The commission will inquire whether the original intent of Congress is being followed in each case.

A look to the future

With one major exception, all laws covering the public domain—those public lands not dedicated to a specific use, such as National Forests—are concerned only with disposal procedures. The only exception is the Taylor Grazing Act of

1934, which authorizes the creation of grazing districts in the western states, pending final disposal. The commission will study the problem of which parts of the public domain should be retained and managed for various uses in the foreseeable future.

Congress charged the commission with four main responsibilities: (1) Review the Federal public land laws; (2) review all the regulations, practices, and policies stemming from those laws; (3) determine the various demands on the public lands which now exist and which are likely to exist within the foreseeable future; and (4) recommend whatever modifications are necessary to enable the public lands to serve the maximum benefit for the general public. These recommendations must be submitted to Congress and to the President of the United States by June 30, 1970.

Membership of the commission

Unlike past groups created to study the public lands, the commission has members from both houses of Congress as well as Presidential appointees—six members appointed by the Speaker of the House, six by the President of the Senate, and six non-Federal members appointed by the President of the United States.

The 19th member was elected by the 18 appointees and serves as chairman. He is Representative Wayne N. Aspinall of Colorado. Vice chairman is H. Byron Mock, a Presidential appointee who is an attorney in Salt Lake City, Utah. Milton A. Pearl is staff director.

In addition, the act provides for an advisory council, which has 33 members, and for representatives of

the 50 state governors to assist the commission.

Eight of the advisory council members are representatives of those Federal departments and agencies chiefly concerned with the public lands and public land policy. The other 25 represent various groups interested in public land problems, including the following fields: state and local government, public land management, outdoor recreation resources and opportunities, landowners, forestry, livestock, mining, oil and gas, fishing, commercial outdoor recreation, industry, education, labor, and public utilities.

Special studies

According to Director Pearl, the study program will encompass 34 studies and analyses, as follows:

(1) History of Public Land Law Development. This is being compiled by Dr. Paul Wallace Gates, professor of history at Cornell University.

(2) Revenue Sharing and Payments in Lieu of Taxes on Federal Public Lands. Contractor is EBS Management Consultants, Inc., of New York and Washington, D. C. Study report was submitted on May 15, 1968.

(3) Digest of Public Land Laws. This has been prepared by Shepard's Citations, Inc., of Colorado Springs, Colo. It is for sale by the Superintendent of Documents.

(4) Forage. Contractor is the University of Idaho. Study report is due in March 1969.

(5) Administrative Rule-Making and Adjudication Procedures of Federal Public Land Management Agencies. Contractor is the University of Virginia. The study is to be completed by November 30, 1968. This will include agency procedures in making regulations, initial adjudication of rights and privileges, and judicial review of administrative decisions.

(6) Land Exchanges and Acquisitions.

(7) Withdrawals and Reserva-

tions. Contractor is Charles F. Wheatley, Jr., practicing attorney of Washington, D. C. Study report has been submitted.

(8) Federal Public Land Laws and Policies in Alaska. Contract has been awarded to University of Wisconsin. Study report is due December 31, 1968.

(9) Future National and Regional Demands for Commodities Producing on the Public Lands. Contractor is Robert R. Nathan Associates, Inc., of Washington, D. C. Study report has been submitted.

(10) Timber. Study contracted to George Banzhaf and Company of Milwaukee, Wis. Report is due March 31, 1969.

(11) Nonfuel Minerals. Legal segment of this study has been contracted to Twitty, Sievwright and Mills, law firm of Phoenix, Ariz., and will be completed by March 31, 1969. The resources segment will be handled under a separate contract.

(12) Energy Fuels. This study has been divided into four parts: (1) Coal (legal); oil shale (legal); oil and gas leasing systems (legal); and fuel resources. The legal study of coal has been contracted to the University of Utah, with a reporting date set for November 30, 1968. The oil shale study, contracted to the University of Denver College of Law, is due February 28, 1969. The fuel resources study is in final draft stage. The study of oil and gas leasing systems, contracted to Rocky Mountain Mineral Law Foundation, is due February 28, 1969.

(13) Water. This was contracted to Charles F. Wheatley, Jr., of Washington, D. C., and Professor Charles E. Corker of the University of Washington School of Law. The study report is due November 30, 1968.

(14) Regional and Local Land Use Planning. Contractor is Herman D. Ruth and Associates of Berkeley, Calif. Study report is due March 31, 1969.

(15) Outdoor Recreation.

(16) Land Grants to States. This will be an in-house study.

(17) Criteria for Judging Facts to Determine what Constitutes "Maximum Benefit for the General Public."

(18) Use and Occupancy of Public Lands.

(19) Fish and Wildlife. Contractor is Colorado State University. Report is due in December 1968.

(20) Intensive Agriculture. Contractor is South Dakota State University. Study report is due March 31, 1969.

(21) Outer Continental Shelf. Contractor is the Los Angeles law firm of Nossaman, Waters, Scott, Krueger and Riordan. The report has been submitted.

(22) Organization, Administration, and Budgeting.

(23) Impact of Public Ownership on Local and Regional Economies.

(24) Noneconomic Aspects and Implications of Public Land Ownership in Local and Regional Areas.

(25) User Fees and Charges.

(26) Techniques and Procedures in Disposing of Federal Lands or Interests in Land.

(27) Adjustment of Use Rights to Achieve Federal Land Management Objectives.

(28) Multiple Use—Advantages and Disadvantages.

(29) Impact of Federal Jurisdiction on Federal Public Land Areas.

(30) Inventory of Public Lands and Resources.

(31) Environmental and Ecological Factors Involved in Public Land Management.

(32) Appraisal Techniques and Procedures.

(33) Trespass.

(34) State Land Policies. ♦

Woodland conservation

SCS technicians play an important role in getting woodland conservation on the land by assisting landowners in developing soil and water conservation plans. ♦

Gravel mulch used to raise water table

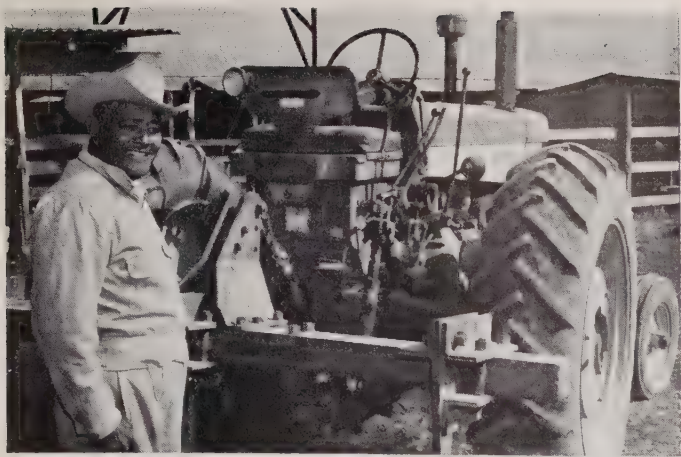
Irrigation farms in parts of the Midwest are pumping more water out of the ground than annual rainfall can restore, USDA's Agricultural Research Service reports. Gravel mulching can help replenish ground water in some areas. A layer of sand or gravel spread on low-value land will catch precipitation, keep most of it from evaporating, and speed it down to the water table, experiments conducted by the Colorado State University show. Dr. William D. Kemper, soil scientist employed jointly by ARS and the university, estimates that gravel mulches could put 10 to 12 additional inches of rainfall each year into the water table.

But some problems still need to be solved. Gravel-mulched areas should be kept weed free, and studies need to be conducted to make sure weedkillers don't contaminate the ground water.

Research is now underway at the University of Arizona on a machine that will extract gravel from gravelly soils and spread it on the surface. On soils averaging at least 20 percent gravel, the cost of the machine operation would be \$10–\$20 an acre—not unreasonable, Dr. Kemper says, considering the yields that can be obtained with irrigation. ♦

Irrigation measures for water management

Irrigation measures may include water-supply reservoirs, diversion dams, pumping plants, sluiceways, canal headworks, canal laterals, and main distribution pipelines to carry water to the farm boundary. They also may include lining canals and sealing storage reservoirs, and measures needed to conserve and use water supplies efficiently and to convey water with the least practical loss. ♦



F. P. Gonzalez uses the modern equipment on the left but remembers how he developed some of the first irrigated land in the Lower Rio Grande Valley with the mule-drawn equipment on the right. Below, Mr. and Mrs. Gonzalez now live in this modern brick home next door to the farm where he once worked for \$0.50 a day.

Rio Grande farmer succeeds with conservation farming



F. P. Gonzalez of Hidalgo, Tex., has seen a lot of changes since he followed the mule teams on the banks of the Rio Grande from sunup to sundown for \$0.50 a day. Now he operates tractor powered equipment on his own 234-acre irrigated farm.

Gonzalez was born of Mexican parents near Hidalgo. When he was in his teens, he worked on the Joe Pate Ranch across the International bridge from Reynosa, Mexico. Here, Gonzalez learned farming and cattle raising. When he was able to buy a team and some equipment he began to farm "on shares" for Joe Pate. Later, he started buying his own land and today part of Gonzalez's farm joins the old Pate ranch.

Mr. Gonzalez began land leveling with mule-drawn equipment in 1952, when he began to apply a conservation plan as a cooperator with the Southmost Soil and Water Conservation District. Now permanent practices are applied, and all but 12 acres of his land is leveled.

Besides his principal measures of land leveling and irrigation pipelines, Gonzalez has carried out a good conservation cropping system.

He uses high tonnage sorghum crops for soil improvement in rotation with cotton and vegetables. All residues from his grain crops are shredded and left on, or near, the soil surface. He also carries out a good fertilization program using fertilizer according to soil tests.

Following three major surgical operations, recently, Gonzalez

thought the big farm might be too much for him to handle. He has rented all but 18 acres until his son Oscar returns from Vietnam to help with the farming. "Life has its pitfalls, but it also has its rewards if you work hard," Mr. Gonzalez believes.—ROBERT W. WILLIAMS, work unit conservationist, SCS, Edinburg, Tex. ♦



Pasture is put to maximum use with full-season grazing

A conservation plan including provision for producing year-round forage enables Fred Felder, a Pike County Soil Conservation District cooperator near Macomb, Miss., to get more grazing from his pastures without exceeding the land's capability.

This year, Felder is putting a hundred cows on 150 acres. This is one cow to 1½ acres, double the traditional ratio in this area of 1 to 3 acres.

With technical assistance from the Soil Conservation Service, Mr. Felder developed a plan to fertilize and manage his pastures so they will carry this increase with very little additional cost per head.

His summer pasture includes 30 acres of bahiagrass plus 60 acres of grass mixed with crimson clover. For winter grazing, he will use 60 acres of fescue.

He will apply 400 pounds of fertilizer to the 30 acres of bahiagrass for summer grazing and 500 pounds of ammonium nitrate per acre to the fescue for winter grazing.

Felder describes his rotation grazing system thus:

"Starting December 1, the cows will graze the fescue for 2 months. Then I'll move them into the crimson clover. When the cows graze that down, they'll go back on fescue.

"During March, I'll rotate between fescue and crimson.

"During April the fescue will be grazed exclusively.

"In May I'll start summer grazing on the 30 acres of bahiagrass. After the crimson clover seed are harvested, I'll start summer rotation grazing on all 90 acres of bahiagrass.

"In the late summer I'll concentrate grazing on the 60 acres of bahiagrass-crimson clover to get the surplus grass off, so the clover seed will germinate. During this time



Fred Felder (left) and R. W. McKay, SCS, look over one of the bahiagrass-clover pastures to be used in rotation with fescue under high fertilization and management for year-round grazing.

the 30 acres of bahiagrass will be growing for frosted grazing.

"At frost time I'll turn the cattle back on this 30 acres and give them a little supplementary feeding."

Fertilizer will be applied before and between grazing periods.

A good many eyes are on Fred Felder. The question is: "Can he carry a cow on an acre and a half?"

People who know him believe he can do it.

R. W. McKay, SCS work unit conservationist, Magnolia, helped Mr. Felder develop the conservation plan. Besides the grazing system, it includes 20-foot wide firelanes to divide a 300-acre timber block into 40-acre plots. The firelanes, planted with fescue, provide roads for timber harvest, as well as winter and early spring grazing.

A good program of woodland management permits native grasses to grow in the woods where the cows can do a little browsing as they graze the fescue firelanes.—HERMAN S. SAUCIER, *conservation agronomist, SCS Jackson, Miss.* ♦

Hot irrigation well supports recreation

When D. O. Bybee drilled for water near Grand View, Idaho, he knew this well could do more than irrigate 40 acres of desert-land.

It was an artesian well that produced 1,260 gallons a minute at a constant temperature of 140° F. In addition, there was a separate vein of cold water that could be mixed to give any temperature desired.

Mr. and Mrs. Bybee traded for 320 acres in southwestern Idaho in 1958. They have since built a recreation enterprise that includes a 30- by 60-foot heated swimming pool, modern bath houses, picnic tables, fireplaces, motel rooms, a stable and training track for race horses, and many other facilities.

At the same time, Bybee has used technical help from the Soil Conservation Service and some finan-

cial help from the Agricultural Stabilization and Conservation Service to expand this irrigation system.

"I sure moved a lot of dirt two or three times before I learned to obtain a good engineering design instead of leveling by guess," said Bybee.

He has leveled the sandy soils on about 300 acres on this and another farm that he leased to his son and son-in-law. In addition, he has installed 3,000 feet of concrete-lined ditch and 4,000 feet of concrete pipeline as a starter on his conservation plan.

Other improvements include four irrigation reservoirs, four pumping plants, two sprinkler systems, two surface irrigation systems, and about 10 miles of irrigation canals and field ditches.

Bybee uses a conservation-cropping system that relies heavily on alfalfa.

In 1959 he was able to irrigate only a 40-acre field. Now, with these land improvements and water-conservation practices, he irrigates about 140 acres with the same amount of water.

The hot water is used to heat the swimming pool and other facilities which help cool the water for irrigation. Bybee can also flood the softball field before using the water for irrigation in the summer or he can leave it as an ice skating rink in the winter.

Another hot artesian well, located 1/2 mile east of the swimming pool, has a temperature of 180°. This well now heats three homes and will be used to heat a large greenhouse. Bybee plans to raise hot house tomatoes on a commercial scale.

Bybee believes in the multiple use of natural resources and claims that he has only scratched the surface on this idea. By this time, he may be planning another use for his hot mineral water.—KEN ROGERS, *work unit conservationist, SCS, Grand View, Idaho.* ♦

Water management is key to good irrigation



Plastic spiles are used to take water out of the concrete-lined irrigation ditch. C. W. McCart (at right) and Earl Markley, SCS engineering technician, study the field together.

A cooperator with Colorado's Delta Soil Conservation District, C. W. McCart, believes that conservation work done on his farm will add \$900 to \$1,000 to his yearly income.

McCart overcame serious ditch erosion and other land and water problems in carrying out his conservation plan, which included extensive land leveling and ditch-lining work. Some irrigation ditches had eroded to 8 feet deep and 6 feet wide because of improper location and steep grades, making it difficult to divert water onto the fields.

So far he has leveled 54 acres and has lined 2,100 feet of ditches. About 1,300 feet of lining remains to be done. The Soil Conservation Service technicians designed the leveling and lining, and McCart did the leveling work with equipment rented from the conservation district.

McCart says that using a land-plane for 2 years following a leveling job keeps the field surface in good condition and remedies unevenness in the finished grade. As

another followup practice to the leveling, he applied 10 to 15 tons of barnyard manure to the cut.

"I figure I can irrigate a fourth more rows with the same amount of water," McCart said.

Mr. McCart listed five major benefits from his conservation plan: (1) Three head ditches eliminated, (2) weed control no longer a problem on ditch banks, (3) 275 point rows eliminated, (4) a tremendous saving of labor in coaxing water onto the field, and (5) seepage losses cut to a bare minimum.—RICHARD R. FRANKLIN, *work unit conservationist, SCS, Delta, Colo.* ♦

District supervisors meet in air to observe progress

Supervisors of the East Carroll-Madison Soil and Water Conservation District, La., held their April meeting in a unique way. The supervisors were airborne 1 1/2 hours while holding their board meeting so that they could fully appreciate the beauty and accomplishments in their district. ♦

My private prairie

By Rex R. Gogerty

An Iowa farmer tells why he refuses to plow a 3-acre patch of virgin prairies:

My 3-acre piece of history could have been broken up years ago. Somehow, though, the Gogerty family has resisted the temptation to turn our plot of virgin prairie into just another 3 acres of cropland. Granddad plowed around it because of a couple of wet spots. In later years, the acreage acquired a kind of unwritten immunity from the plow. Since then it has become a sanctuary for adults and kids fascinated by undisturbed nature, for wildlife and for hunters.

A string of tile and a sharp plow could help this kind of land produce whopping yields. But once the unkempt, flower-spattered prairie is plowed under, there's no turning back. So far, we've been more sentimental than sensible.

It's easy to get sentimental about the un-retouched nature that carpeted three-quarters of the Corn Belt when Indian tepees were in style. The buffalo and Conestoga wagons are long gone, but school kids claim these mounds are sure-enough Indian graves, and old-timers still reckon the prairie grass is belly deep on a respectable cow pony.

It seems there's more than sentimental value to the few patches of virgin prairie left in this country. Dr. R. W. Pohl and his colleagues in Iowa State University's botany department have identified more than 60 different kinds of flowers and grasses that grow only on unplowed prairie. You won't find them in a creek meadow or timber pasture.

"Outside of a few State-owned prairies, these plants and grasses have survived only in scattered

areas along railroad rights-of-way and country graveyards," says Dr. Pohl. "This undisturbed soil also holds many chemical and entomological secrets." Scientists view native prairie as a standard by which they can measure how much modern agriculture is changing original Corn-Belt soils.

Virgin prairie is not spectacular from a distance. Like a fine painting or grandmother's crocheting, it has to be studied and touched to be appreciated. The coarse grass has an odor midway between sweet and musty, and the feel of elegant carpet under your feet. In July, the wild aster, blazing star, yellow cone-flower, and dozens more lend a colorful but haphazard pattern to the lush landscape. This panorama is a refreshing end-row oasis.

I pasture that corner of the north eighty occasionally; I've even cut it for hay a few times. I realize it's pretty shaky management to let what could be corn ground escape the plow, but there's more than one way to measure the good produced by land.

As one old-timer told me as he looked across my private prairie haloed in a summer sunset: "It took the Lord a thousand years to raise that crop; no use getting in a hurry to tear it up."—*The Furrow*, April 1968. ♦

USDA grants for India irrigation research

Research on surface irrigation will be conducted by scientists in India under grants paid for by USDA in Indian rupees obtained through sales of farm products to India under Public Law 480.

Under a 5-year grant, the Indian Institute of Technology at Kharagpur will study the relation between water movement and efficiency of surface methods of irrigation.

Using both model and field tests, Indian scientists will define various rates of waterflow and soil intake, slope, and soil textures and correlate these variables with the rate of total irrigation flow. ♦

And the trails finally go somewhere

Three bridges to cross meandering streams have made a much-needed conservation education area and nature trail a reality in the rapidly growing college town of Amherst, Mass.

Supervisors of the Hampshire Conservation District stepped in to help when the Amherst Conservation Commission found itself short of funds after developing an outdoor conservation area to preserve examples of "wild land."

The nature trails had been laid out and youth groups and interested citizens had assisted in developing them. But, the commission found the trails were "all dressed up with no place to go" because three bridges were needed to cross the streams.

The Hampshire District obtained a grant of \$2,500 for the bridge construction through funds made available by the Massachusetts State Committee for the Conservation of Soil, Water, and Related Resources.

In the fall of 1967, a formal ceremony was held to dedicate the bridges and conservation area. Town selectmen, conservation commissioners, Hampshire District supervisors, and members of the state committee were in attendance. They all looked on as a bright-eyed, fifth-grader cut the ribbon to officially open this new resource for the people of Amherst.

The trails finally went somewhere.—VERNON E. JOHNSON, *work unit conservationist*, SCS, Northampton, Mass. ♦

Small watershed projects

Small watershed projects have come to mean protecting, managing, improving, and developing the water and related land resources of a watershed up to 250,000 acres in size through a project-type undertaking.

Forest Soils Conference to review research

The Third North American Forest Soils Conference will be held August 5-10 at Raleigh, N. C. under the sponsorship of the Department of Soil Science and School of Forest Resources of North Carolina State University, Soil Science Society of America, Society of American Foresters, Canadian Institute of Forestry, and the Canadian Soil Science Society.

Purpose of the conference is to bring together research scientists and practicing foresters who are concerned with a knowledge of soils and soil-vegetation relationships to review and discuss recent research contributions in forest soils, soil classification and surveys, and the use and application of soils information in various phases of forest land management.

L. F. Kalmar, general manager, Continental Can Co., will deliver the keynote address on "Forest Soils from an Industrial Overview."

At the end of the meeting field trips will be conducted to observe soils and vegetation in the Upper Coastal Plain and Sandhills.

Plains Council consults on water, farm programs

The Great Plains Council at its annual meeting August 1-2, in Denver, Colo., will consider a basic theme in three sections: Water Resources, Farm Programs, and Topics of Importance in the Plains.

Among the many speakers in the Water Resources Section will be Harry Steele, assistant director for planning, Water Resources Council, Washington, D. C., and Victor L. Hauser, research agricultural engineer, Agricultural Research Service, Bushland, Tex.

Horace Godfrey, administrator of the Agricultural Stabilization and Conservation Service, Wash-

ington, D. C., and Charles McDougal, assistant administrator, Federal Extension Service, Washington, D. C., will discuss farm programs.

One of the several speakers in the section on Topics of Importance in the Plains will be Dr. J. C. Evans, director of Community and Industrial Progress, Oklahoma State University, Stillwater, Okla.

Conservation Society on resources and environment

"Creative Conservation for Life and Living" will be the theme at the annual meeting of the Soil Conservation Society of America to be held on August 18-21 in Athens, Ga.

Among the speakers are Jack W. Carlson, Council of Economic Advisors, Executive Office of the President, Washington, D. C.; Ralph R. Widner, executive director, Appalachian Regional Commission, Washington, D. C., and Raymond F. Dasman, director of Environmental Studies, Conservation Foundation, Washington, D. C.

The meeting will wind up with a choice of tours to Marbury Creek watershed, Southern Piedmont Conservation Research Center, poultry production in northeast Georgia, and forestry.

Dates and places

August 1-2, Great Plains Agricultural Council, Denver, Colo.

5-10, Third North American Forest Soils Conference, Raleigh, N. C.

18-21, Soil Conservation Society of America, Athens, Ga.

18-22, The Conservation Education Association, Colorado Springs, Colo.

September

3-7, American Institute of Biological Science, Columbus, Ohio.

11-13, International Association of Game, Fish and Conservation Commissioners, Tuscon, Ariz.

22-25, Farm and Industrial Equipment Institute, Boston, Mass.

22-27, National Conference on State Parks, Hot Springs, Ark.

23-27, Urban Land Institute, Denver, Colo.

28-October 3, American Institute of Planners, Pittsburgh, Pa.

29-October 2, American Bankers Association, Chicago, Ill.

30-October 3, Society of American Foresters, Philadelphia, Pa.

Review



World Without Hunger. BY ORVILLE L. FREEMAN. 1968. *Fredrick A. Praeger, New York.* 190 pp. \$5.95.

The Secretary of Agriculture briskly and briefly states his credo and program for a world without hunger.

His book clearly states the current situation in world food production patterns and world population pressures. He tells of the role that American agriculture has played in recent years through Public Law 480 and the Food For Freedom program.

He explores the difficulties that must still be overcome in world agricultural development, as well as the achievements that have been made where there is determination to succeed, and he looks at the use of capital and credits by governments, the place of private investment, and the record of voluntary agencies, foundations, international bodies, and cooperating American executive agencies, such as AID and the Peace Corps.

"This book seeks to explore," he says, "what you and I can do as individuals and what our nation and other nations must do as governments to free mankind from the threat of famine. It is written out of my conviction that, if all peoples work together, nightmares of starvation can be forgotten and we can realize the age-old, sweet dream of a world without hunger."—B.O.

Prairie Plants and Their Environment. BY J. E. WEAVER. 1968. *Univ. of Nebr. Press, Lincoln.* 276 pp., illus. \$6.95.

This book is the last chapter in the late Dr. J. E. Weaver's lifelong study of the prairies, the full story of which is told in 104 scientific publications of which he was author or co-author.

Weaver was in his early eighties when he wrote this book. It does not pretend to encompass new studies. Rather, it assembles under one cover the highlights of his work and that of many of his graduate students.

Dr. Weaver was always impatient of students whose eyes stopped at ground level, who failed to visualize each nook and cranny of the soil in which roots could conceivably be found. It is not surprising, therefore, that three of 14 chapters deal specifically with the nature of prairie plant roots and the soils in which they grow.

For almost 60 years a spade and an ice pick (for working soil away from roots) were the major items in Dr. Weaver's field kit. In one 4-year study alone, 150 trenches, each 2.5 feet wide, 5 to 10 feet long, and 5 to 15 feet deep were used to study 1,500 root systems in various kinds of soil.

In addition to the three chapters on roots and soils, four chapters deal with the floristic and ecological nature of the prairie, three are concerned with the effects of grazing, three with drought, and one with woodlands adjacent to prairies.

A liberal array of meticulous drawings and excellent photographs illustrate the text. Also included is a complete list of Dr. Weaver's publications plus doctoral theses by some of his students that further describe the nature of prairies.

This condensation of a number of detailed studies and publications will be of interest and value to students, workers, and laymen with some affinity for prairies and plains. —ARNOLD HEERWAGEN, *range conservationist, Regional Technical Service Center, SCS, Lincoln, Nebr.*

New publications

Site Selection and Development: Camps—Conferences—Retreats. 1965. *United Church Press, Philadelphia, Pa.* 19102. 174 pp., illus. Prepared by the Committee on Camps and Conferences of the National

Council of the Churches of Christ. This handsome spiral-bound book shows the imprint of the professional architects, engineers, designers, and planning consultants who contributed to its production. Although it describes facilities for activities of "the church in the outdoors," the principles and many of the specifics are equally useful for other types of recreation, camp, and conference installations.

Manual of Septic-Tank Practice. Rev. 1967. U. S. Dept. Health, Education, and Welfare. *Public Health Service Publ.* 526. 92 pp., illus. An updating of a manual first published in 1957 to reflect changing trends in the problems of individual sewage disposal systems and including new data on the design, installation, and maintenance of septic tanks. William G. Shannon, Engineering Division, Washington, D. C., was the Soil Conservation Service representative on the Joint Committee on Rural Sanitation that served in an advisory capacity in revising the publication.

Resource Conservation and Development Projects. Rev. 1968. *SCS-CI-14.* 4 pp., illus. Facts on RC&D projects initiated by local people that involve more than one county and include all interests in the area—rural, suburban, and urban—for the purpose of developing natural and related resources.

Room to Room. 1968. U. S. Dept. Interior, *Bur. of Land Management.* 32 pp., illus. \$0.50. A beautifully illustrated publication in color, it is a recreation guide to public lands that lie mostly in the Western States and Alaska. Numerous points of interest are listed by regions—the Rockies, the Southwest, the Great Plains, the Great Basin, the Northwest, southern and central California, and Alaska—all keyed to large colored documented maps throughout the text.

Soil Conservation Districts. Rev. 1968. *USDA PA-417,* 8 pp., illus. Tells what they are, how they work, and how SCS helps them.

Farm Real Estate Market Developments. 1968. *USDA Economic Research Service CD-70.* 46 pp., charts.

Soil surveys

Harrison County, Kentucky. BY HUBERT B. ODOR, BILLY C. WEISENBERGER, ROBERT L. BLEVINS, AND JOHN L. TAYLOR. 1968. 58 pp., illus; maps 4 inches to the mile (1:15,840).

Walthall County, Mississippi. BY ALBERT R. LEGGETT, ALLEN C. MILBRANDT, L. BROOKS HALE, AND PAUL J. BARLOW. 1968. 76 pp., illus.; maps 3.17 inches to the mile (1:20,000).

AMERICA THE BEAUTIFUL LITHOGRAPHS



America The Beautiful—New Hampshire

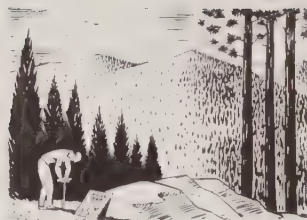
USDA SOIL CONSERVATION SERVICE

MULTIPURPOSE POND ON FORMER FARMLAND, SULLIVAN COUNTY SOIL CONSERVATION DISTRICT

Full-color lithograph prints suitable for framing—one for each state, Puerto Rico, and Virgin Islands—are available from the Superintendent of Documents for \$0.10 each or \$5 for set of 52. Obtain order blanks from your local SCS or post office.

From the Administrator:

Greater Benefits From Our Forest Lands



One of the seven major objectives of USDA's program of Resources in Action/Agriculture 2000, defined recently by the Secretary of Agriculture, is "Obtaining greater benefits from our forest lands."

Whole rural communities depend for their existence and strength on forest land and its products—for timber and wood products, for environmental protection, for recreational and esthetic purposes, for water supply, and for grazing and browsing by domestic stock and wildlife.

The production of timber on land owned by farmers and other private owners is of key importance in the United States, particularly in the East. Encouraging the further development of viable farm woodland enterprises, particularly in areas of substandard income and low opportunity, can help meet timber needs and at the same time bring about an economic and social change for the better in rural America.

All over the Nation are small landowners who, once barely able to keep their farm enterprises going, are now investing in farm improvements, equipment, and household appliances and other amenities they had not enjoyed previously. Many owe this economic gain to the addition or improvement of woodland products as a crop.

Planning a woodland by landowners for sustained performance as part of a balanced farm operation, as a commercial wood-crop enterprise, or as a recreational retreat, is a complex procedure. It involves matching the physical resources of the tract to the economic and per-

sonal circumstances and desires of the owner and operator.

It is at this point of fitting the operator's land use pattern and management goals to the physical features of his land resources that the Soil Conservation Service can make its major contribution to woodland resources development. Information from the soil survey, interpreted in terms of woodland potentials, is an invaluable source of guidance at the crucial planning stage.

The Soil Conservation Service has a concern with conservation on woodlands, not as a separate activity served by a separate corps of technicians but as a part of the total soil and water conservation program for any tract of privately owned land.

In helping a landowner develop a conservation plan for his land, SCS soil conservationists can help him consider and evaluate the feasible alternatives as affected by information about the soils he has to work with.

Finding the relationships between soils and trees is a "team" job. Foresters and soil scientists work together to locate suitable study sites, to describe soils and measure tree growth, and to analyze results. This involves many people and many agencies. Few studies are made solely by the Soil Conservation Service. State forestry agencies generally assist by making and recording the tree measurements. Colleges of forestry and representatives of industry help to ascertain soil-tree relationships.

Basic forest soil research by the Forest Service, colleges, and industry is essential to determining these correlations. Improved understand-

ing of the relations of trees to the many variables in soil, resulting in improved management techniques, has emerged from this basic research. This, in turn, has improved the efficiency of mapping forest soils. SCS work is based on such research and continues to be improved by it.

Forest industries with large holdings are potentially the most intensive users of forest soils information. Some industries employ soil scientists to map their own soils. Most, however, depend on the SCS and the soil survey for soil information needed in planning woodland operations.

To make our soil information more useful, SCS has developed a national system of classifying soils as to their suitability for woodland use and management. It gives us for woodland what we have had for many years for cropland in our land-capability classification.

Woodland interpretations are predictions of growth and behavior of trees on specific soils. They indicate soil-related capabilities, hazards, and limitations affecting tree crops and the use of forest land for multiple purposes.

The most numerous users of soil survey information are owners of smaller woodland tracts. A majority of them are cooperators with one of the more than 3,000 local conservation districts, which are in position to help the landowner get assistance from many sources. Some districts have equipment and facilities of their own for the use of cooperators to put their plans into effect.

More of the Nation's farmland is in trees than in any other crop except grass. There is a challenge and an opportunity to put that valuable resource to work to increase the strength and stability of rural America. The soil survey with woodland interpretations and other special evaluations of soils, helps the planner and manager to use these precious resources wisely.

D. A. WILLIAMS

If your address changes, please notify us of your complete new address, including Zip Code number, and include old address with our code number as shown above.

A do-it-yourself conservation tour guide

A guide to enable teachers taking classes on field trips find examples of conservation on the land is proving to be a popular teaching aid in Manitowoc County, Wis.

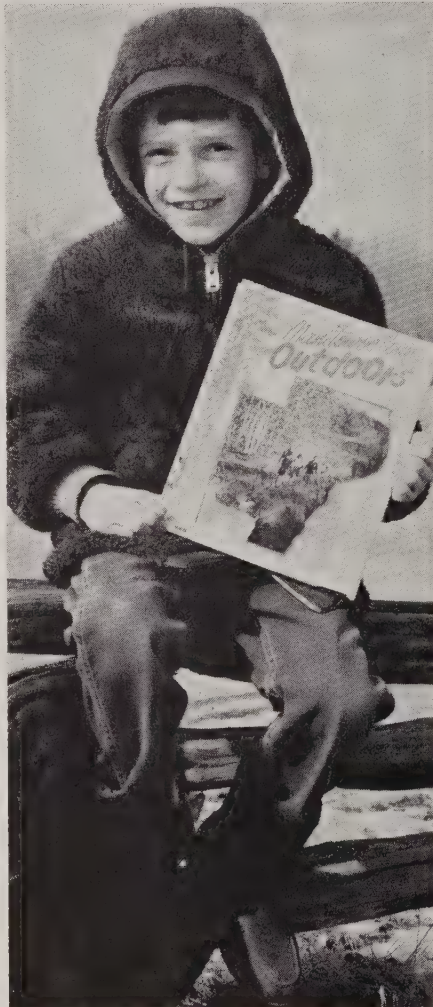
It is an equally popular tour-aid for individuals who simply want to see things for themselves.

The 140-page fully illustrated booklet was published jointly by Conservation Education, Inc., of Manitowoc County and the Manitowoc County Soil and Water Conservation District. Conservation Education, Inc., is a private organization funded by local contributions.

The guide, entitled *Manitowoc County Outdoors*, contains illustrations and explanatory comment for hundreds of sites having conservation, historical, or geographical interest. It also explains how the natural resources have influenced the economic development and welfare of the county. A special 10-page section briefly relates the geological history of the Lake Michigan shoreline and promotes understanding the county's present geography.

A large map at the back of the guide locates each site and identifies it by a number. Sites are indexed and cross referenced by resources emphasized at each, enabling the user to plan for tours or individual site visitation to suit his interests.

Most sites are illustrated by aerial photos on which symbols and terms have been placed to show locations



An attractive booklet with chrome-color cover invites youths, adults, and "Sunday travelers" into the Manitowoc County countryside. (Photo courtesy of Conservation Education, Inc.)

of specific conservation measures. The sites may be hiked over by permission of the owner. Many can be viewed from observation stops on the highway.

Nearly all sites involving applied conservation measures are on the land of Manitowoc County Soil and Water Conservation District

cooperators. Each cooperator feels proud and honored to be a part of the county's conservation education program.

A narrative introduction for each major resource subject area and the glossary provide information for use in discussion and observation of the site.

Manitowoc County Outdoors, released in 1967, is the product of several years of cooperative effort on the part of an editing committee consisting of conservation technicians, educators, individuals, and organizations interested in better conservation education. For years the conservationists have been ardently sought after to visit classrooms and individual groups to tell about resources and the need to properly manage them. These visitations were time consuming for the conservationists, and still there were many who were not reached.

It became evident that professional conservationists needed to concentrate on teacher and leader development and on assisting with conservation field days involving hundreds of students at a time. The stage was reached long ago where teachers and leaders should assume the role of pretrip preparation and posttrip followup. Now, with the outdoor guide, they can conduct their own field trips.

When the local people in Manitowoc County request assistance in conservation education—they get it!—NORMAN E. SCHMEICHEL AND DONALD W. NIENDORF, *work unit conservationist, SCS, and conservation education specialist, State Soil Conservation Board, Manitowoc, Wis.* ♦

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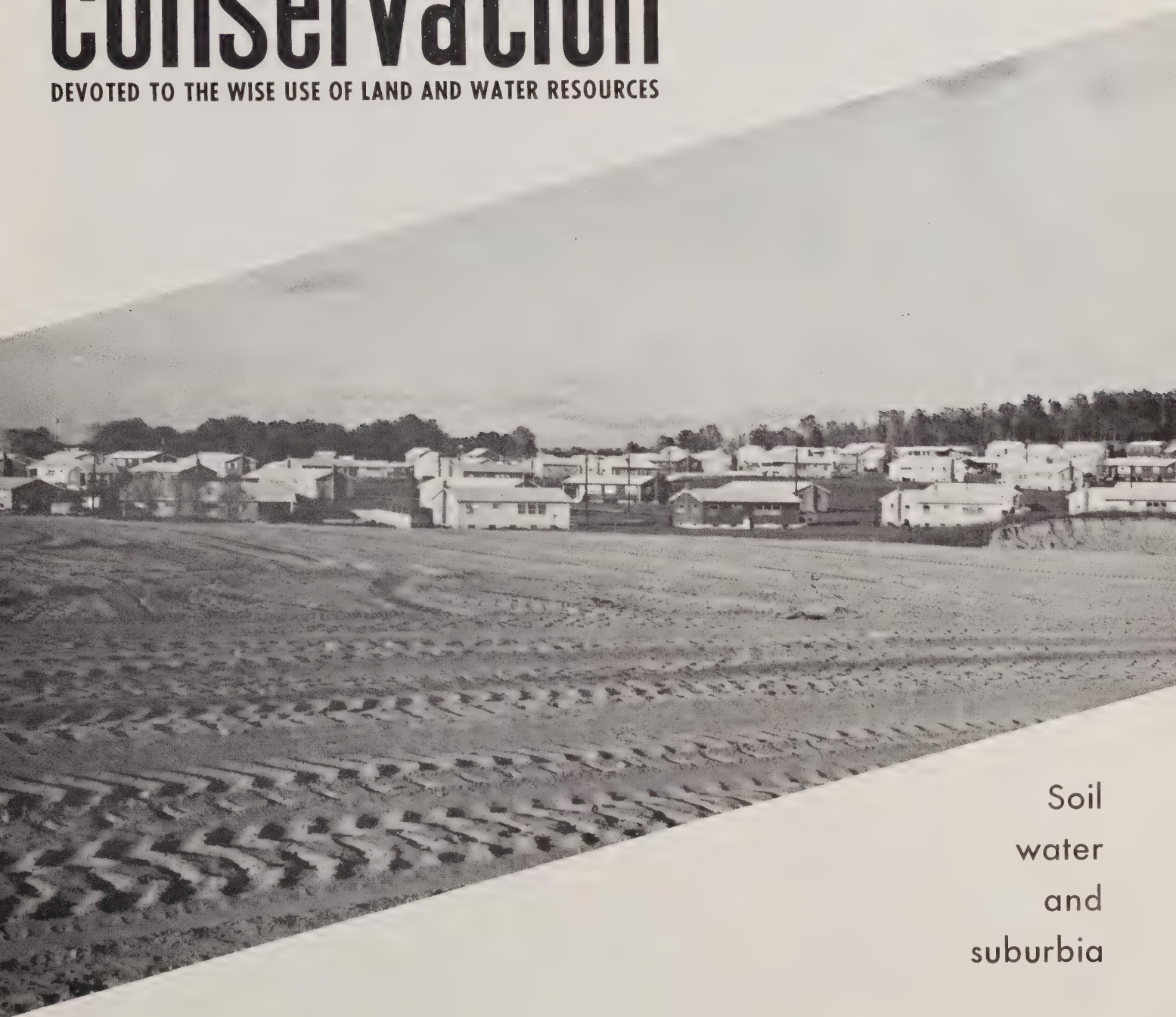
SEPTEMBER 1968

Vol. 33, No. 2

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soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES



Soil
water
and
suburbia

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: A suburban development in Connecticut illustrates the widespread exposure of soil that is common during building and reminds us that "under all is the land."

Suburban . . .

About a year ago, a national Conference on Soil, Water, and Suburbia brought into focus a growing concern with conservation problems of urbanizing areas.

SCS first identified urbanization as a conservation problem because of the large amount of productive farmland being absorbed in built-up areas and superhighways.

Administrator Williams' article in *Soil Conservation* for October 1956 was a milepost in recognizing this new land use dilemma.

His editorial (p. 47) in this issue reflects the newer realization that much land inevitably must be used for urban purposes and that soil and water technologies can serve those purposes as well as agricultural ones.

"Under all, the land": Under this title a former editor of this magazine, Tom Dale, considered (October 1957) some of the conservation problems of suburbia itself and reported the first employment by a county of a full-time soil scientist.

In this issue Stuart Finley (p. 35) describes the comprehensive program of runoff and sediment control that same county, Fairfax, Va., now has in effect. And John Quay (p. 27) tells how a suburban county on the edge of Chicago bases land use planning on soil information.

Soil surveys have official status in regulating sanitation in Pennsylvania (F. Glade Loughry, p. 31) and shoreland protection in Wisconsin (A. J. Klingelhoets, p. 33).

soil conservation

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SOIL CONSERVATION is the official magazine of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. Use of funds for printing this publication approved by the Director of the Bureau of the Budget (July 17, 1968).

ORVILLE L. FREEMAN, Secretary of Agriculture

JOHN A. BAKER, Assistant Secretary of Agriculture

DONALD A. WILLIAMS, Administrator, Soil Conservation Service

BEN O. OSBORN, Editor

GEORGIE A. KELLER, Production Editor

Prepared in the Division of Information, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C. 20250

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Using the facts to find the plan

The planner's task is one of finding the plan, as Henry McKaye said 40 years ago in his book, *The New Exploration*.

Today, the problems and methods are different but the task is the same. How does today's planner find the right plan for orderly land use in a developing suburban area?

In McHenry County, Ill., on the edge of Chicago, we believe that we can find the plan through a meaningful evaluation of our natural resources—an evaluation of the capabilities and suitabilities of the landscape for urban, agricultural, recreational, and conservation uses. We are basing this evaluation on information about the soils, geology, hydrology, and topography of the area, and other resource data.

For example, as part of this evaluation we have made a watershed map that divides the county into what we believe to be man-

ageable watersheds. The watershed boundaries were determined not only from consideration of surface hydrology but also of the need for a common resource interest among the residents.

The Soil Conservation Service, in cooperation with the McHenry County Soil and Water Conservation District and the McHenry County Regional Planning Commission, recently provided us with a map showing all the potential reservoir sites of more than 5 acres within the county. This survey will serve as major background information for a water-management study which the commission is now undertaking.

Comprehensive resource evaluation sometimes reveals unexpected potentials for land use as well as forewarning of problems.

One area in the county is predominantly of a sandy, well-

Illinois county officials turn to soil maps and resource data as guide to good land use

By John R. Quay

Executive secretary, McHenry County Regional Planning Commission, Woodstock, Ill.



Sod farms are making use of some of the wet bottom lands that are not suitable for row crops. Photo courtesy McHenry County Regional Planning Commission.

drained soil, considered one of the least productive for farming. But when the geologist, ground water hydrologist, soil scientist, and plant material specialist got together and all looked at the same area at the same time, they found that it overlies a large sand and gravel deposit that holds a great deal of ground water suitable for irrigation. The plant material and soil specialists indicated that with modern management techniques the area could be one of the most productive in the county.

The level topography, good internal soil drainage, abundant water supply, a nearby toll road, and a "farm" zoning classification, which in reality permits 1-acre residential use, also make the area very attractive to the subdivider and the land speculator.

But the use of this area for small-lot housing with septic tanks for waste disposal could very well contaminate the water supply for both irrigation and domestic purposes.

If our preliminary evaluation proves valid we are hopeful that we will have sufficient technical data to convince both the agricultural interests of the county and the county legislative body that it is in the public interest to restrict land uses in this area to agricultural activities.

"Our goal," says Ted Wickman, chairman of the McHenry County Regional Planning Commission, "is to effectively guide future development to obtain maximum benefits from both natural and human resources for the welfare of the present and future residents of our county."

Maps of limitations

To get at this task, we are developing a series of colored maps indicating degrees of limitations for various land uses based on the capabilities of those natural resources. The McHenry County District, with assistance from SCS soil scientists, provided us with information about the soils. With these data the commission developed interpretative maps depicting soil limitations for building foundations, agricultural uses, and septic waste-disposal systems, and presence of water hazards.

One of our major problems is in translating technical information into language that is meaningful to the public. In our experience, the best way to do this is with graphic presentation. In order to standardize on a uniform, readily understood legend, we applied the universal traffic light color system. Green (as in a go sign) is used to indicate no or slight soil limitations

for a potential use. Yellow (caution) indicates a moderate limitation—problems which can be economically overcome. Red (stop) shows severe limitations—not that the soil cannot be used for a specific purpose but rather that the problems inherent in it are severe and that it may not be economically feasible to overcome them for that use.

Geologic maps

We have worked also with the Illinois State Geological Survey in developing interpretative geologic maps. These maps used the same coloring system as the soil maps. Some of the geologic interpretative maps show location and quality of sand and gravel resources and areas suitable for heavy building foundations. Others indicate availability of ground-water supplies and areas of potential ground-water pollution.

Although we have not completed all the natural resource evaluations needed, the information is already being put to use. Last year, the McHenry County District working with the McHenry County Planning Commission answered more than 350 requests for consultative services from developers, realtors, public agencies, and other landowners. Most of the inquiries dealt



McHenry County produces 40 percent of the sand and gravel used in the Chicago metropolitan area. Soil maps help locate gravel deposits. Photo courtesy McHenry County Regional Planning Commission.

with the suitability of a certain tract of land for a specific type of land use.

The city planning commissions of Crystal Lake, Marengo, and Woodstock, all communities within McHenry County, are already developing their own copies of interpretative maps for use in guiding their local land use planning.

Problem of coordination

The planning job is not easy and has not been completed. Fragmentation of authority among a number of federal, state, and local agencies is one aspect of the problem. Another is the high degree of specialization of many resource experts.

Specialization often limits understanding of the total evaluation approach and the necessary working relationships that have to be established with other technical disciplines. Scheduling of coordinated assistance by several agencies is also difficult, and agency functions are often restricted to a narrow field of endeavor. Probably the root of all these problems is a lack of experience in a team approach to regional planning and land use problems.

One way to overcome some of these difficulties might be to establish a natural resource service cen-

ter in each metropolitan area where one repository of skills, services, and knowledge would be staffed by personnel from a variety of federal, state, and local agencies. Such a center should be equipped to do both laboratory and field research on problems of the metropolitan area. It should also work closely with institutions of higher learning, especially in senior and graduate level programs relating to the use of natural resources.

We believe such a center would expedite the task of planning land use developments in line with the capabilities of natural resources. ♦

Another Soil, Water, and Suburbia Conference

The third of a series of state and regional conferences growing out of the national Soil, Water and Suburbia Conference in Washington, D. C., in June 1967 is scheduled in the Center for Continuing Education in Athens, Ga., November 25 and 26.

Atlanta representatives of the U. S. Department of Housing and Urban Development, under the direction of Regional Administrator Ed H. Baxter, are working with SCS State Conservationist Cecil Chapman and his staff on arrangements.

Other conferences on problems arising from the changing of agricultural land to suburban uses were held in Austin, Tex., in October 1967, and Baton Rouge, La., in February 1968. ♦

New motion picture on suburban problems

"Mud," a 23-minute documentary motion picture focusing on urban and suburban development as a source of damaging sediment, was recently released by Stuart Finley Productions, Falls Church, Va. SCS is one of the sponsors of the new film.

The idea for "Mud" had its birth in the national Soil, Water, and Suburbia Conference in Washington, D. C., June 15 and 16, 1967. The head of the firm, Stuart Finley, veteran Washington radio-television announcer and now chairman of the Northern Virginia Soil and Water Conservation District, was a conference speaker.

"Mud" is the most recent of nearly a score of films produced by the Virginia firm dealing with watershed conservation problems. The series includes "The Green City," award winner at the New York International Film Festival, "Teamwork on the Potomac," and "Crisis on the Kanawha." ♦

Roadbank project creates beauty and controls erosion

Some 3½ miles of bare, eroded road cuts and fills have been seeded on the Long Creek Road in Macon County, Tenn., as a pilot roadbank erosion control and beautification project measure with the Hull-York Lakeland Resource Conservation and Development Project.

Long Creek Road is a Federal secondary road that leads to the Macon County Golf Course and serves as a gateway to the northwestern part of the county. It is the main street to one of the growing subdivisions near Lafayette.

The Macon County Soil Conservation District sponsored the project, and the Macon County Highway Department assisted the district with labor to apply lime, fertilizer, seed, and mulch purchased with RC&D funds. Many landowners along this road contributed equipment and labor for seedbed preparation. The Soil Conservation Service supplied the technical assistance for the project measure.

Following plans for treatment, 3 acres were seeded to fescue and white clover, and 4 acres to sericea and annual lespedeza. One acre was planted to kudzu and 0.1 acre to crownvetch. Seven seeding mixtures for use in vegetating Tennessee roadbanks, recommended by the Joint SCS-University of Tennessee Plant Materials Committee, were seeded for comparison in plots along the Long Creek Road.

George W. Hauskins, chairman of the Macon District and associate RC&D director, said, "This work shows what can be done to change the unsightly roadsides in Macon County to attractive features of the landscape."

"This pilot project looks very good," Harold Cothran, road supervisor for the Macon County Highway Department, said. "It indicates what we can do toward establishing vegetation along bare roadsides in the entire county."—ARTHUR G. FUQUA, work unit conservationist, SCS, Lafayette, Tenn. ♦



Top, Paul Tucker (left) and Tom Page check seedbed and seed; center, Raymond Forkum seeds the roadbank; and bottom, Paul Tucker, Jess Dyer, J. C. York, and Raymond Forkum (left to right) spread mulch on the newly seeded roadbank on Long Creek Road.



City dwellers move to the suburbs to escape close-crowding neighbors and to find fresh air and gracious living. Too often, they find instead that they have escaped from sanitary facilities and services that they took for granted.

When the septic system clogs up, or the well water takes on a suspicious unpleasant taste, the dream begins to fade. And when the neighbors' sewage taints the air, disillusionment is complete.

There can be still more surprises. Trash and garbage collection may not be adequate, because of cost of disposal. Or a poorly located, poorly operated disposal site can be a nuisance, producing offensive odors or smoke, breeding flies and rats, and polluting water with odorous leachate.

Sewage Facilities Act

Rapid expansion of population into formerly rural areas around cities and towns has made these problems critical in most states. Pennsylvania has found it necessary to enact new legislation to meet the environmental health problems posed by rapid urbanization.

The Pennsylvania Sewage Facilities Act of 1966 provides for the planning and regulation of community and individual sewage disposal systems. It requires municipalities to submit comprehensive plans for meeting sewerage needs in their jurisdictions. It requires permits for persons installing such systems and authorizes the Pennsylvania Department of Health to adopt rules, regulations, standards, and procedures.

The Sewage Facilities Act puts responsibility on more than 2,500 municipalities in Pennsylvania. The cities, towns, townships, and boroughs can act cooperatively or jointly in carrying out provisions of the act.

The State Department of Health is charged with enforcement of the act in municipalities that do not make provision for its application

Soils and sanitation

On-lot sewage disposal and sanitary landfills depend on soil as a purifying agent

By F. Glade Loughry

Soils technologist, Pennsylvania Department of Health, Harrisburg, Pa.

or that do not follow standards and regulations. State funds are provided for reimbursing municipalities for half the cost of local enforcement and for half the cost of official plans.

The municipal plans are being prepared by planning commissions and consultant firms. Rate of growth is the principal factor in setting dates for completion of plans. Plans are required to show:

- (1) Areas where community sewage systems are now in existence.
- (2) Areas where such systems are planned to be available within 10 years.
- (3) Areas where community systems are not planned within 10 years.

Soil survey is basis

Where public sewer systems do not exist, the plan must include an evaluation of the soils in terms of

their capability for on-lot sewage disposal. This is commonly based on the detailed soil surveys made by the Soil Conservation Service. In a few critical areas where soil surveys have not been made, matching funds have been granted to municipalities to help them enter into agreements with SCS for accelerated soil surveys.

Consideration of soils is involved also in issuing permits for new individual sewage systems as required by the act for lots less than 1 acre in size. Traditionally, on-lot disposal has meant a septic tank with a tile distribution field for subsurface percolation of effluent.

Soil surveys are the first tool in screening applications for permits. Detailed information on type of soil, depth to seasonal high water table, depth to bedrock, slope, and percolation rate must be furnished. Where the soil survey is available

An experimental landfill near Kennett Square, Pa., is in Chester silt loam, a deep, well-drained soil. The culvert pipe gives access to the interior of the fill for sampling and recording equipment.



these data can be taken from it, subject to onsite checking and confirmation.

Many soils have characteristics that make them clearly unsuitable for standard subsurface sewage disposal systems. These include:

- (1) A high ground-water table,
- (2) shallowness to impermeable rock,
- (3) steep unstable slopes,
- (4) slowly permeable subsoil,
- (5) flooding by stream overflow, and
- (6) shallowness to a very permeable layer, such as creviced limestone or coarse gravel, that does not filter and purify the effluent.

A reliable guide

The presence of soil features that indicate these conditions is usually more reliable than limited and possibly biased tests made under poorly controlled conditions. For example, the easily recognized denseness, platy structure, and mottling of a fragipan tells more about the permeability of a site than percolation tests made at shallow depths in a dry season when water can spread laterally in loose soil above the pan. Also, soil mottling indicating seasonal wetness identifies a poor site even if the inspection is made in dry weather.

Some soils that by definition are deep, well-drained, permeable, and on gentle to moderate slopes are good risks for on-lot disposal systems. The percolation rate to be used in designing the tile field for a given volume of effluent can be based on standard test data of the Pennsylvania State University Soil Characterization Laboratory.

Other soils on mixed materials vary so much within short distances that general interpretations cannot be used with confidence. They require on-lot examination to locate a safe spot for a tile field.

Alternatives to conventional septic tank and tile field systems need to be considered for some situations. One is in areas where sewers are scheduled for installation in 2,

5, or 10 years, and builders need to maintain momentum to justify eventual construction of the sewers. Another is for lots that have remained open in a developing area because of poor sites. Here the question often is: "Why is a permit denied for this lot when the neighbors have septic tanks that have never given any trouble?"

Also there is a need for temporary measures that will work for a while where sewers are definitely scheduled for early completion.

One alternative to a septic tank and filter system is an aeration tank. Such equipment does an even better job of breaking down wastes. A good system destroys 85 to 90 percent of the biodegradable material in the sewage.

An aeration system also gives a safer effluent where the tile field includes limestone with crevices or beds of clean gravel that do not filter the effluent. In this situation, a sand filter in the distribution trench spreads and slows the effluent so that it has more time in contact with the soil.

Other alternatives include pumping effluent to a point where satisfactory soil is found; filling an area with permeable soil to get sufficient soil depth above the water table or above gravel; and holding tanks. A holding tank is expensive if used for an extended period because all sewage has to be pumped to tank trucks and hauled to a sewer system where it will be accepted by a treatment plant.

Ton of wastes a year

Disposal of solid waste is another aspect of a problem that grows with changing technology and growing population. Estimates of the total annual production of solid wastes range from $\frac{3}{4}$ ton to over a ton per capita.

Sanitary landfill is an economical way of disposing solid wastes. Alternative methods are incineration, composting, and feeding garbage to hogs.

Soil is an important considera-

tion in all of these methods. Incineration and garbage feeding reduce the volume of waste but still leave residues that have to be disposed of in landfills or on the soil. Composting yields a soil conditioner that is useful to agriculture.

Landfilling requires careful site selection and strict control of operations to avoid raising other problems. Many people associate landfilling with dumping and react to a proposal of a nearby site by saying, "Put it somewhere else."

Aside from the emotional problem, there are real hazards to be overcome in locating and operating a sanitary landfill. Decomposing garbage, trash, and industrial wastes yield a wide range of obnoxious products. Good soil properly used has a great renovating effect on the intermediate products.

If the reaction can be kept aerobic, most of the organic matter breaks down to carbon dioxide and water. If the sanitary landfill is below the water table, methane is a principal gas product and soluble products combine with water to make a dark offensive leachate. If excess water is present, leachate breaks out of the fill to pollute surface water and ground water.

A good sanitary landfill provides for placement of the solids in a trench where they can be compacted and covered daily with at least 6 inches of soil. This prevents accidental fires, blowing of papers, propagation of flies and rats, and escape of odors. Final cover needs to be with at least 2 feet of soil.

Soil conditions that are suitable landfill sites are such that landfills are in competition for good land with agriculture, the housing industry, highways, and many recreational enterprises. The soil should be deep, well drained, medium or moderately coarse in texture, on gentle to moderate upland slopes, without many stones or boulders, never flooded by streams, and not underlain by rock that has large channels or by gravel beds that will not filter leachate. ♦

Zoning with soil surveys

Wisconsin counties use soil maps in regulating building on flood plains and shorelands

By A. J. Klingelhoets

State soil scientist, SCS, Madison, Wis.

More people responsible for land use planning are picking up soil survey maps since Wisconsin's Water Resource Act was adopted in 1965. It requires all counties in the State to lay down rules for the protection of all shorelands in unincorporated areas.

Detailed soil surveys help local units of government—villages, cities, and counties—to set forth flood-plain zoning, required by the act, where appreciable damage may occur.

"Shorelands"—according to the act—is land within 1,000 feet of a lake, pond, or flowage and generally within 300 feet of a stream.

A starting point

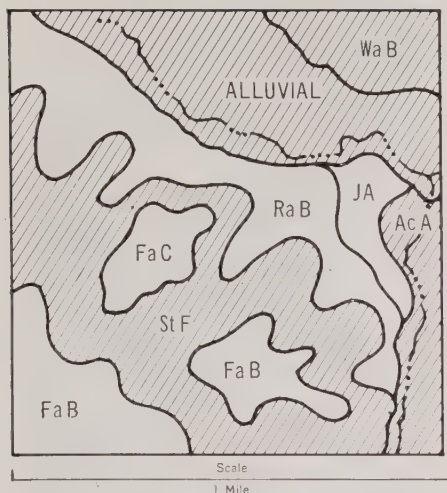
The soil map does not offer all the answers needed, but it serves as an effective base map. It also provides basic information about the soil and its behavior in various uses.

Alluvial soils in floodways of flood plains can be marked readily on the soil map. In some instances the outer boundary of the 100-year frequency flood is essentially the same for flood plain and floodway. When this is not true, topographic maps, experience flood maps, high watermarks, and local knowledge can fill in.

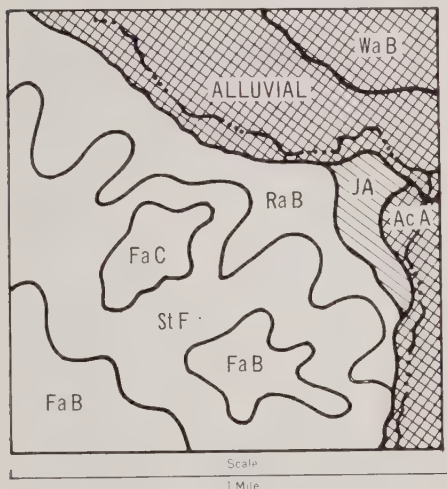
In some counties the soil map is a part of the official document the zoning ordinances are based on.

The county board of supervisors of Buffalo County was the first to use the detailed soil survey as a base map in its 1965 zoning ordinance. This was before the adoption of the 1965 Wisconsin Water Resources Act.

Since that time most of the counties in Wisconsin with completed soil surveys have used the soil maps as base maps for their ordinances. In each case, dollars are saved in procurement of suitable base maps.



Map showing soil delineations with severe limitations for onsite soil absorption sewerage systems and for building sites.



Alluvial soils subject to flooding

High water data indicates additional areas subject to flooding

The high water table at this basement excavation must be overcome through added expense for construction design or avoided by zoning for other development. Soil maps interpreted to show hazards of high water table or flooding, such as the examples above, help avoid such problems.



Additional savings in time and cost of delineating flood plains could easily exceed \$5,000 per county where a soil map is available.

The local officials are using the maps to help designate areas for farming, parks, airports, golf courses, wildlife and nature preserves, game farms, picnic grounds, hunting, fishing, and hiking. They are finding the maps useful in determining where the filling, dredging, lagooning, and grading of land may be done, and where the cutting of shoreline vegetation should be permitted.

The maps, too, are helpful in determining the size, shape, and placement of lots for buildings, and the use, size, and type of structure.

Two basic ordinances

The county boards responsible for shoreline protection regulations are finding they need two basic ordinances. One applies to land use; the other is concerned with sanitation. Several counties are considering countywide application of sanitary and land use zoning ordinances based, in large measure, on detailed soil survey maps.

Where the soil survey is the base map used for countywide sanitary and land use zoning, the savings to the local people are great. South-eastern Wisconsin Regional Planning Commission once estimated that the soil inventory for a seven county area could result in \$300,000 savings to the local people just in locating homes on suitable sites where sewage disposal systems would function properly.

The Wisconsin University Extension Service, in cooperation with the State Department of Natural Resources, is providing help to local citizens in using soil information in zoning. The Soil Conservation Service, in its work through soil and water conservation districts, is helping to interpret and apply the soil survey information. ♦

Conservation newsletter for teachers sparks interest in Indiana district activities

By Robert L. Eddleman

Work unit conservationist, SCS, Terre Haute, Ind.

A newsletter published for teachers by the Vigo County Soil and Water Conservation District in Indiana has helped put conservation in the classrooms of the Vigo County School Corporation.

Peter Farmer, member of the school board and former district supervisor, recognized the enthusiasm among teachers and administrators for a newsletter and soon the *Conservation Education News* was started in November 1966.

The *News* is a one-page mimeographed newsletter with ideas and hints teachers can use in the classroom. A typical issue has four or five short articles that might describe demonstrations the teacher or students can perform to clarify a lesson, or tell of a new reference source or publication. Dramatic problems such as water pollution, littering, and desecration of public areas receive special attention.

Soil Conservation Service personnel assist the district board in developing material for the newsletter. Editing and reproduction are done by the district's office secretary. Distribution to more than 200 elementary school teachers is made by the Vigo County School Corporation through its mail system, thus eliminating postage and addressing costs to the district.

Since publication began, the district reports an increase in resource-related activities in the schools. Teachers and students now come by more frequently to obtain reference materials or to ask for help in teaching conservation. School Corporation Superintendent Dr. George Huys recently said, "Most teachers feel a responsibility to teach conservation to their students, but many of them have only the broad, general facts in our text-

books. The newsletter and other helps from the district increase their effectiveness by offering specific projects and local information."

As a result of this increased interest the district is now making plans to participate in the annual Business-Industry Education Day sponsored by the Terre Haute Area Chamber of Commerce. During BIE Day teachers visit an industry or business and take information on its operation back to their students.

The district will conduct a visit to a local small watershed project to show about 35 to 40 teachers resource conservation in action.

Interest created by the newsletter is partially responsible for a cooperative agreement signed by the school corporation and the district. The district will provide technical assistance to the schools in planning needed conservation practices on school lands which in turn will serve as outdoor conservation laboratories. ♦

Conservation districts merge for broadened action

Two Utah soil conservation districts in operation for nearly 30 years have consolidated for more effective conservation action.

The new Canyonlands Soil Conservation District was formed by the recent merger of the Paria River and Escalante River soil conservation districts.

The area includes Bryce Canyon National Park and the Dixie National Forest. More than 98 percent of the District is publicly owned land. The many streams running through the district drain into the Colorado River above Grand Canyon. ♦



Soil conservation goes to town

Virginia district takes program to suburban area



By Stuart Finley

Chairman, board of supervisors, Northern Virginia Soil and Water Conservation District, Fairfax, Va.

Modern soil and water conservation has gone to town where most of the people are.

It concerns their land, trees and grass, and the streams that wind through suburbia.

It deals with eroding soil, fouling sediment, choked septic tanks, and with the many associated problems generated by the sometimes too rapid change from rural to urban uses of the land.

One of the problem-burdened areas of swift transition includes

the Virginia counties across the Potomac River from the Nation's capital. These now densely peopled counties—Loudoun, Fairfax, and Prince William—are united in their fight to bring order and planning to bear on their resource problems in the Northern Virginia Soil and Water Conservation District.

Fairfax is one of America's most rapidly growing counties, population-wise. The two other counties are feeling the shock waves of

change, but for the most part there remains time and opportunity for guided development and prevention of injury.

Citizens and officials of Fairfax County asked for help from their conservation district, organized in 1945 primarily to assist farmers with their conservation problems.

In response to the emerging land use crisis, the district and the Soil Conservation Service established a work unit to deal specifically with suburban problems. Meantime,



HYDROSEEDING. New specialized equipment that sprays a mixture of seed, fertilizer, and mulching material makes it possible to stabilize difficult cut and fill slopes quickly.

STORM DRAINAGE. A permanent storm drainage system should be a part of every building plan. In this one, a fixed liner and masonry outlet establishes a permanent grade for the ditch.

DEBRIS BASINS. Basins at strategic low points on a building site trap erosional debris during construction. Sediment may be redistributed and the basin obliterated when the work is done, or the basins may be made a part of the permanent water-control system.



Conservation practices for urban sites

Builders are finding practical ways to reduce erosion on construction sites during installation and to stabilize them when the work is completed. Here are some of the practices that have been used with success in the Northern Virginia Soil and Water Conservation District.



JUTE NETTING. Fibrous mulches, such as this jute netting, give temporary protection to bare construction sites and slopes. On other critical areas, short-lived grasses can be seeded following rough grading.



STRAW MULCH. Small-grain straw or hay also can be used as a mulch on exposed sites. Here the mulch is anchored by boards set as baffles across the slope to spread runoff water and give further protection.



Loudoun and Prince William counties each continued to have its own work unit devoted primarily to agricultural practices.

The Northern Virginia District has no regulatory powers. It makes consultive and technical services available to individual citizens, departments of the county government, other government agencies, and private organizations.

County takes responsibility

The heart of the suburban conservation program is the County of Fairfax itself. Its government agencies provide leadership, determine policy, and operate from day to day in many ways. The district deals primarily with the county board of supervisors, the county planning commission, the planning department, and the department of public works. Other important services are provided for the Fairfax County school system, the Fairfax County Park Authority, the Northern Virginia Regional Park Authority, and the Virginia Department of Highways.

The Northern Virginia Builders Association and the Homebuilders Association of Northern Virginia support the district's efforts to prevent erosion and sedimentation. Particularly useful are technical reports which are published from the homebuilder's own point of view and carry details of how to apply conservation during the development process.

Citizen action

Popular support for suburban conservation comes from county citizens. For instance, the League of Women Voters developed a slide show and supplied speakers for civic groups on the subject of urban erosion and sedimentation. The Northern Virginia Conservation Council provides a forum for citizen reaction. This group has worked to preserve green space, acquire parkland, and develop sensible guidelines for urban development within the county. Several

watershed committees and similar resource oriented organizations also participate in this effort.

Here are some of the urban conservation problems the district and cooperating interests deal with: (1) Soil erosion, (2) sedimentation of lakes and streams, (3) flooding and flood-plain control, (4) land slippage, (5) stream and lake management, (6) green space and parkland acquisition, (7) wildlife habitat preservation and improvement, and (8) public information and technical guidance about all phases of resource conservation and development.

The fundamental problem of preventing erosion, sedimentation, and flooding centers around the development process. Most erosion in urban areas occurs during the construction of homes, shopping centers, schools, highways, and other facilities. Thus, the solution to the problem is to convince builders and developers, and the planners and designers who work for them, to adopt proper procedures. This is done by direct contact or through the Fairfax County official mechanism.

Information program

An effective information program which includes technical data and criteria is more constructive than simple coercion. But, providing information materials, evaluating projects, and conducting training programs must be a continuing effort.

As Fairfax County has developed in a few decades from rolling farmland to a suburban community with a population of more than 400,000, certain procedures, techniques, and facilities have been developed:

(1) Fairfax County employs a fulltime soil scientist. A soil survey has been made of all undeveloped areas of the county.

(2) Fairfax County has gradually developed a system of subdivision design regulations. The depart-

ment of public works uses these criteria to prevent problems which would be caused through inadequate or improper design. The "Gray Book" outlines these criteria and ties them into the County Code. This book was written and is periodically reviewed by the Continuing Review Committee, a volunteer group of local engineers.

(3) Fairfax County has a strict set of regulations which prohibit flood-plain development or intrusion. Difficulties resulting from earlier flood-plain development are gradually being corrected.

(4) Fairfax County has passed an erosion and sedimentation ordinance. It sets the standards, and it controls the occasional irresponsible operator. Its language is brief, and the technique has been to tie certain important controls directly into the County Code by adding scope to existing regulations.

(5) The Northern Virginia Soil and Water Conservation District is now completing comprehensive watershed evaluations for all 30 of the county's stream valleys.

(6) The SCS soil conservationist provides consultive and technical services to county departments, other public agencies, private organizations, and individuals. These services range from designing temporary silt basins for developers to advising a homeowner on how to correct an eroding ditch on his property.

(7) Fairfax County and the Northern Virginia District are co-sponsors of a flood-prevention project in the Pohick Creek watershed.

Within this total framework, then, Fairfax County has the authority and responsibility to guide and regulate; the Northern Virginia District assists all parties; the builder and developer have the responsibility to follow criteria and adhere to the ordinance; and the general public should show sufficient interest to provide motivation for these various conservation efforts. ♦

Yakima Indians ban gravel pits near roads and make recreation areas of old ones

White Americans can learn a lesson or two about conservation from the Yakima Tribal Nation in south central Washington State.

With an eye for beauty, utility, and tourists, the Confederated Tribes and Bands of the Yakimas has banned gravel pits near well-traveled roadways and has developed fishing ponds on existing pits.

In a time of rapidly expanding highway and road systems, demand for gravel is growing also. This gravel traditionally comes from surface mining, which results in many unsightly holes in the ground.

It's only natural that road builders should try to get their gravel as near as possible to where they are building. Roads mean tourists, and tourists mean money these days. Gravel pits don't make for nice scenery alongside a new or rebuilt highway.

Quarter-mile setback

From now on, tribal leaders have decided, additional gravel pits will not be authorized on Indian-owned lands within a quarter mile of a well-traveled roadway.

The Yakimas control about two-thirds of the 1.2 million acres of land in Toppenish Soil and Water Conservation District. About a thousand miles of roads would be subject to surface-mining policies.

On the positive side, the Yakimas are moving to make existing pits useful and attractive. For example, they have converted a 4-acre pit west of Toppenish into a fish pond for youngsters up to 14 years old. In addition, they have developed plans for a park and picnic area on adjacent land. The pond has been stocked annually with trout since 1955, but in the fall of 1967, tribal officials changed to bluegills and bass on recommendation of the

U. S. Bureau of Sport Fisheries and Wildlife.

The pond today is a mecca for children of all races. Water from underground seepage is enough to maintain fish year 'round. If needed, additional water can be obtained from a nearby canal system. Any local youngster can direct a stranger to "Charlie's Pond," as the fishing spot is known.

The Yakima Tribe also has converted another 2-acre gravel pit into a fish pond for children.

Beside keeping gravel pits away from highways, the Yakimas now require slopes of stipulated grade. In some instances, bared slopes must be planted.

Example for landowners

Toppenish Soil and Water Conservation District is urging other landowners and operators in the district to follow the examples of the Yakimas—and with some success. A number of gravel pits have been refilled during land leveling and covered with topsoil. Some

landowners have developed fish ponds. Some pits serve as waste water disposal systems for irrigated land. In areas of high water table, some farmers and ranchers pump water from pits for irrigation.

Around Toppenish, there are some 170,000 acres of irrigated land. About a fourth of this has the type of soil, underlain by gravel readily available and close to existing roadways, that is attractive to contractors. Result: some 250 known gravel pits in the district, varying from a tenth of an acre to 10 acres in size and averaging 8 feet deep. In an area equivalent to a township, an aerial photograph of some years ago indicated 36 gravel pits containing water. Most pits contain water during irrigation season; some, the year around.

Stagnant water is a natural habitat for mosquitoes. Weeds and other evidence of neglect make for unpleasant scenery. With beautification so important to all Americans, both for tourists and residents, it behooves us to attend to the scenery alongside our roads.

This is a philosophy that has become policy on land controlled by the Yakima Indian Nation.—DONALD N. DAVISON, *work unit conservationist, SCS, Toppenish, Wash.* ♦

Charlie's Pond, formerly a 4-acre gravel pit, on Yakima tribal land is a mecca for children of all races.





A 40-acre citrus grove near Mission, Tex., (above) is prepared for level irrigation by machines working between the trees. In a double-set orchard after between-the-tree land leveling (below) the older trees benefit from more efficient irrigation while the young trees grow to maturity.

An easier way to irrigate

Citrus growers take advantage of frost kill to level land between trees in old orchard

Don't sell the fellow short when he stops, wipes the sweat from his brow, lays down his irrigation shovel in disgust and says, "There must be an easier way!" That can be the birth of progress—the progress of more efficient irrigation systems.

That's how between-the-tree land leveling started.

A large percentage of the citrus trees in the Lower Rio Grande Valley of Texas was planted before 1950, which was about the time land leveling was becoming a popular conservation practice. For this reason, much of the old citrus plantings are on unlevel land.

Then in January 1962, the valley





Pruning after a frost kill makes room for land-leveling machines to work between the rows in an old orchard.

had one of the most damaging freezes on record. It killed many citrus trees. The ones that survived had to be pruned back.

In the spring of 1963, the boards of supervisors of the Southmost and Willacy-Hidalgo soil and water conservation districts decided that it was time to do something about inefficient irrigation systems on or-

chards planted on unlevel land. Since the tree canopies had been pruned back, land-leveling equipment could work between the trees and could reshape the surface of existing orchards.

Soil Conservation Service irrigation engineers helped develop criteria for leveling orchards. Standards are much the same as for open

land. The cut and fill depths are limited to avoid excessive damage to the trees.

Leveling permits a close-spaced tree setting or double-setting existing trees, because on level land irrigation borders need be constructed in only one direction, not at right angles to one another as on unlevelled land.

The cost of leveling groves varies according to the amount of earth moved and the difficulty of moving it. The average cost is about \$40 an acre.

Since 1963, more than 6,000 acres of existing citrus orchards have been leveled in the two conservation districts. This is about one-fourth of the acreage needing leveling. This work has been done at a cost of about a quarter of a million dollars.

Water and irrigation labor requirements average one-third less on leveled land. This saving, plus increased citrus yields, usually offsets the cost of leveling in less than 2 years.—HAROLD C. CAMPBELL, soil conservationist, SCS, Mission, Tex. ♦

Wind erosion at low level in the Great Plains

Land damaged by wind erosion in the Great Plains in 1967-68 decreased by 1,253,960 acres or 51.5 percent from the previous year, SCS's final summary of wind-erosion conditions for the season ending May 31 shows.

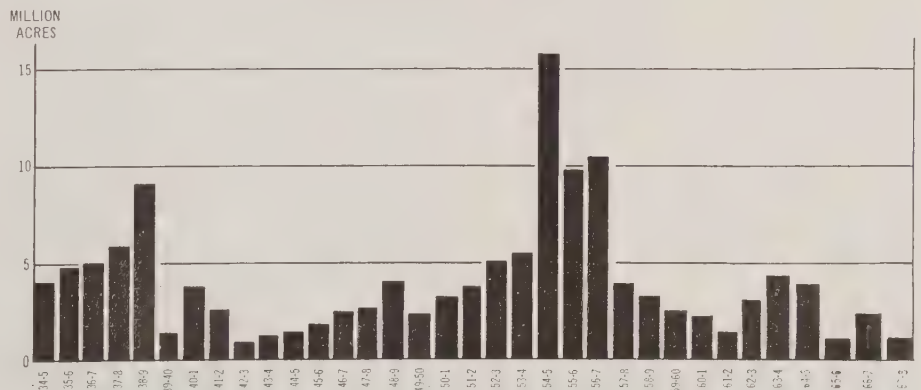
Some 1,178,933 acres was damaged in 211 counties compared to 2,432,893 acres in 202 counties a year ago. Of the total land damaged, 94.7 percent was cropland (1,116,020 acres), 2.9 percent rangeland, (34,160 acres), and 2.4 percent other land (acres).

The Southern Plains states reported 463,613 acres (39.3 percent)

and the Northern Plains states reported 715,320 acres (60.7 percent) damaged.

North Dakota with 445,000 acres and Texas with 311,290 acres sustained 64.2 percent of the damage. ♦

ACRES OF LAND DAMAGED ANNUALLY IN GREAT PLAINS
Seasons 1934-35 to 1967-68, inclusive



Farmer sweetens that lemon acre with hybrid Coastal bermudagrass

Frank Dawson, a farmer near Vanceboro, N. C., knows the value of the old saying, "When you get a lemon make lemonade out of it." He owns a small farm on the River Road where Mother Nature dumped huge piles of sand during the past centuries.

Mr. Dawson is not the type of person to just sit and watch and wait. He tried to use this piece of land in every way possible. Realizing that he was getting nowhere fast, he made application to the Lower Neuse Soil and Water Conservation District. A soil map was prepared and a conservation plan was developed.

His farming operation succeeded, except for this one "lemon" of about an acre in size that defied all treatment given to it. It simply was a dead spot of sand that produced only dust for his living room table every time the wind blew.

Frank once said, in discussing his farm plan, "I'll be honest with you, I've tried everything and then some, and I really don't want to waste any more money on that piece of sand."

But after considering a few of the plants that SCS had put into use in recent years, he did agree to try hybrid Coastal bermudagrass. It so happened that he had helped his neighbor across the road plant some on soil that was very similar, so he took home a few sprigs and planted them. To his amazement they lived, and by the end of the summer they had made remarkable growth. Frank still was not convinced that this grass was going to live on the sand hill, so he waited another year.

Then, with additional information and observation, Frank prepared a seedbed and planted the field to the grass. Since this was "give it a one-more-try idea," he carried out recommendations to the best of his ability. By the end of the



Frank Dawson views the harvest from his 7 acres of Coastal bermudagrass. The hay was cut after the four yearlings and a cow grazed all summer on the area.

summer, he was convinced that the grass had merit. It even gave him a little grazing for his milk cow.

The next summer Frank bought three calves and a heifer in addition to his old milk cow, and they had all they could eat. In fact, a stack of hay was harvested in the late fall from the surplus growth.

Then came a dry year and the corn crop was extremely short. But

the dry weather did not hurt the bermudagrass and this made that project look even better.

Frank can now show anyone who is not a total believer in Coastal bermudagrass how he traded "dust" for "beef steak" on his living room table, and you can't argue with that kind of success.—O. R. HECHT, work unit conservationist, SCS, New Bern, N. C. ♦

Tree planting featured in Algerian projects

Tree planting was the main activity in several soil conservation projects intended to provide work for unskilled laborers in Algeria under a technical aid agreement between the United States and the Algerian Government.

As project conservationist at Al Asnam, I helped with the technical supervision of the work. The United States provided the tools and part of the pay for the workers in the form of wheat and vegetable oils. The Algerian Government supplied the rest of the pay.

Workers prepared a planting site

for each tree by leveling an area 3 to 4 feet across, graded slightly against the slope to hold some water. Planting stock, mostly in pots, came from two project nurseries and several older Algerian nurseries. Where livestock were kept out, survival was good.

Eucalyptus and aleppo pine were the main trees planted. Cypress, cork oak, and cedars were also planted on selected sites. Olives, almonds, figs, and carobs were planted, to the extent stock was available, for fruit and nut production. Large acreages in the

mountains were better suited for grass but shortage of adapted seed and the fact that hand labor was not suitable for planting grass greatly limited this practice.

Most projects were in mountainous areas where the land was steep and eroded and unemployment and poverty were the greatest. There was no problem of securing authority to work on private or public land. Government officials and private landowners were aware of the need for erosion-control measures, and workers were friendly and willing to cooperate. At the peak period, more than 10,000 Algerians were employed.—T. D. DICKENS, *area conservationist, SCS, Hays, Kan.* ♦

Music student works at conservation for district

What does the scheduling of grass seed drills have to do with a university student studying music?

George Davis can see the connection clearly because he is studying music, and he is spending the summer working for the South Caddo Soil and Water Conservation District at Anadarko, Okla.

Mr. Davis, a 22-year-old Negro, is a music student at Oklahoma State University. He is employed to gain work experience by the Office of Economic Opportunity on the Operation Mainstream Project. Davis works for the South Caddo District and receives supervision from the Soil Conservation Service.

His job is assisting in the management of the grass seed drills owned by the district.

"The sale of grass seed and the rental of equipment to district co-operators is a sizable project for the South Caddo District," Davis says. "I schedule the equipment located at Anadarko, and I have my hands full." Other district equipment is located at nearby Fort Cobb.

Up to now Davis has helped nearly 100 district cooperators purchase and plant 24,000 pounds of weeping lovegrass seed.

M. A. Caruso, chairman of the board of supervisors of the district, thinks highly of Davis' work. "Davis' efficiency and pleasing personality have made him a success with local farmers," he says.

Davis isn't wasting any time

Mulch planting permits double cropping

Mississippi farmers near Hattiesburg are using wheat and soybeans in a mulch-planting system that conserves both soil and water.

In this system the soybeans are planted with a mulch planter following the wheat harvest. No land preparation is necessary, little time is lost between the two crops, and the ground has a continuous protective cover.

With technical assistance from the Soil Conservation Service, soil conservation district commissioners in the area have sponsored a number of field demonstrations to show farmers the techniques of mulch planting and harvesting.

Cooperator Earl Hartfield examines wheat on his farm in the Forrest County Soil Conservation District.



while he's away from school. Besides being choir director for the Morning Star Baptist Church, he plays piano, presents vocal solos, and directs a singing group.—A. P. OTTINGER, *work unit conservationist, SCS, Anadarko, Okla.* ♦

One Forrest County District co-operator, Jim Bob Walters of Sunrise, used the double cropping system to grow wheat following soybeans and produced 27 bushels of wheat an acre. He now believes he can raise the wheat yield and winter his beef herd on the wheat also.

Results are proving that the wheat-soybean combination fits well into both large and small operations in south Mississippi.

P. T. Eubanks, Sumrall, vice president of the Mississippi Association of Soil and Water Conservation District Commissioners, grew wheat and soybeans on 200 acres with an average of 35 bushels of wheat an acre.

"Wheat never stops growing due to cold weather," says Mr. Eubanks. "It is one of the best grazing crops we can grow during winter months. Cattle grazing it will gain more than a pound a day over a 2½-month grazing period."

Yance Carter, Moselle, who farms 87 acres, using wheat as a double crop with soybeans on 40 acres, is also enthusiastic about the system.

Agricultural groups have cooperated in helping the farmers find markets and produce high-quality wheat.

The Forrest County Farmers Cooperative, managed by James Tatum, set up marketing facilities for the Hattiesburg trade area.

The Soil Conservation Service assisted with many field demonstrations and is helping south Mississippi farmer-cooperators apply conservation plans that include mulch-planted soybeans following wheat.—W. B. GARY, *work unit conservationist, SCS, Hattiesburg, Miss.* ♦

Meetings . . .

Water federation to discuss waste disposal

The Water Pollution Control Federation holds its 41st annual conference in Chicago, Ill., September 22-27 with concurrent sessions for presentation of technical papers.

Subjects include federal-state relationships, industrial waste disposal, water quality in the Great Lakes, water-resources planning, and research on everything from algae to prevention of oil spills.

Papers on topics of special interest to agriculture will include: Lagooning treatment of kraft paper mill effluent, potato processing wastes and byproduct feed recovery, treating poultry plant wastes, disposal of digested sludge on cropland, combined treatment of sewage and sugar beet wastes, a new biological process for treating dairy waste, and tannery waste treatment.

Forestry and human environment discussed by American foresters

The 68th Annual Meeting of the Society of American Foresters will be held in Philadelphia, Pa., September 29-October 3, 1968. The 1968 theme is "Forestry and the Human Environment."

The Divisions of Education, Economics and Policy, Forest Management, Forest Recreation, Forest-Wildlife Management, and Watershed Management will hear the theme discussed in their separate programs.

Dates and places

September 3-7, American Institute of Biological Science, Columbus, Ohio

11-13, International Association of Game, Fish and Conservation Commissioners, Tucson, Ariz.

22-27, National Conference on State Parks, Hot Springs, Ark.

22-27, Water Pollution Control Federation, Chicago, Ill.

23-27, Urban Land Institute, Denver, Colo.

28-Oct. 3, American Institute of Planners, Pittsburgh, Pa.

29-Oct. 2, Farm and Industrial Equipment Institute, Atlanta, Ga.

29-Oct. 2, American Bankers Association, Chicago, Ill.

29-Oct. 4, American Society of Civil Engineers, Philadelphia, Pa.

30-Oct. 3, Society of American Foresters, Philadelphia, Pa.

October

6-9, American Chamber of Commerce Executives, Portland, Oreg.

7-10, American Mining Congress, Las Vegas, Nev.

7-10, National Association of State Foresters, New Orleans, La.

12-17, Congress for Recreation and Parks, Seattle, Wash.

13-17, American Park and Recreation Society, Seattle, Wash.

13-17, National Recreation and Park Association, Seattle, Wash.

13-16, American Forestry Association, Portsmouth, N. H.

23-27, Association of Engineering Geologists, Seattle, Wash.

27-31, American Forest Products Industries, Washington, D. C.

27-Nov. 1, National Association of Travel Organizations, Las Vegas, Nev.

31-Nov. 3, Sprinkler Irrigation Association, Coronado, Calif.

Youth projects interest students in conservation

The dropout rate is low among Bay County school children who volunteer for youth conservation projects sponsored by the Bay County Soil and Water Conservation District in Florida.

Joe T. Saunders, SCS conservationist for the district, started the program 9 years ago with a minimum budget but plenty of enthusiasm from the district board of supervisors and school officials.

The program is planned for schools where the most interest is noted during the preplanning sessions for school teachers.

For the third graders, Saunders prescribes only posters and scrapbooks designed to create an interest in conservation.

For the older groups, the projects become increasingly difficult. One of the teams has taken on the beautification of a large industrial park in Panama City.

In the sixth grade, each student is offered a variety of projects. Saunders says that 95 percent of the students in a class who volunteer for the program will complete the course. Each class that is selected to participate is called a club. Students select their own officers, choose their own project (which is usually on the school grounds), and set up their personal projects.

The youngsters have sold cookies and washed cars to raise money to buy shrubbery, which they plant

on Saturdays when school is out and Saunders has the day off.

The 1966 National Youth Conservation Award Winner, Miss Linda Voss, was one of the first youngsters to get interested in the program, Joe points out. It has also paid off for 96 children who earned their way to summer camp last year.

"The program is an effective aid to our school system and provides the children with knowledge and experience not available elsewhere," said Assistant School Superintendent Marvin McCain. ♦

Judges examine a partridge pea planting, an entry in the Boy Scout soil conservation contest near Panama City, Fla.



Review



Soil Dynamics in Tillage and Traction. BY WILLIAM R. GILL AND GENE E. VANDEN BERG. 1968 *USDA Agr. Hbk.* 316. 511 pp., illus.; paper. \$1.75.

This handbook conveys both definitive and practical information concerning soil dynamics to persons interested in tillage and traction.

Where possible, mathematical treatment has been developed in quantitative terms to express specific soil-machine relations on the assumption that these relations must obey fundamental laws.

Basic forms of soil behavior, such as shear failure and sliding friction, have been identified and quantitatively described by behavior equations.—R. C. BARNES, *agricultural engineer, SCS, Washington, D. C.*

Irrigation of Agricultural Land. EDITED BY ROBERT M. HAGAN, HOWARD R. HAISE, AND TALCOTT W. EDMISTER. 1967. *American Society of Agronomy, Madison, Wis. Agron. Monogr.* 11. 1,180 pp., illus. \$22.50.

This is one of the best books on irrigation to be published in recent years. The book is pointed primarily at the soil, water, and plant aspects of irrigation with some attention to planning. Construction, maintenance, and economics are not specifically treated.

The editors have done a competent job of organizing a multitude of subjects written by numerous authors without letting the book become a hodge podge of general information. There is a minimum of overlap between the chapters.

The list of authors, of which there are 120, reads like the who's who of irrigation in the United States, with several foreign countries also represented.

Numerous literature citations provide a very useful up-to-date bibliography for the student of irrigation agriculture.

This book provides a badly needed single, unified reference work on irrigation that reflects the latest thinking by a carefully selected group of well-qualified authors.—T. H. QUACKENBUSH, *irrigation engineer, SCS, Washington, D. C.*

Introduction to Flood Proofing. BY JOHN R. SHAEFFER. 1967. *Center for Urban Studies, University of Chicago.* 60 pp., illus. (No price indicated).

Introduction to Flood Proofing was prepared as part of a study of certain aspects of flood-plain management conducted by the Center of Urban Studies for the U. S. Corps of Engineers and the Tennessee Valley Authority.

It presents information and guidance on techniques for preventing flood damage to structures and contents of buildings in a flood-hazard area.

A number of simple but effective measures for reducing flood damage are described and illustrated. The uses and limitations of each are clearly set forth. The structural engineering aspects of programs for flood proofing are presented with a generous use of sketches and photographs.

So far as we know, this is the first general treatment of the subject made available to the public. It will be received with gratitude by people responsible for the care of buildings in the many flood-hazard areas of the country.—H. C. ENDERLIN, *assistant director, Engineering Division, SCS.*

Converting Land From Rural to Urban Uses. BY A. ALLAN SCHMID. 1968. *Resources for the Future, Washington, D. C. (distributed by Johns Hopkins Press, Baltimore).* 103 pp. \$4.

In a tentative treatment of a subject that calls ever more urgently for positive analysis, this report of

one of *Resources for the Future's* land use studies addresses itself mainly to two aspects of the problem: (1) Land prices and costs of urbanization, and (2) needs for further research.

The results are interesting and significant, but they fall far short of the promise of the title. The reader will find no consideration of physical and biological resources involved nor of the social and economic forces so important in the conversion of land from rural to urban uses.

Emphasizing the inadequacy of existing data, the author presents statistical tables indicating that, in general, land price increases on the order of 1,000 percent (with wide variation, of course) from the time the land is used for farming until it is offered as a developed urban building site.—B.O.

Soil Acidity and Liming. EDITED BY ROBERT W. PEARSON AND FRED ADAMS. 1967. *Amer. Soc. Agron., Madison, Wis. Agron. Monogr.* 12. 274 pp., illus. \$7.50.

This monograph is one of a series started by the American Society of Agronomy in 1949. It is a comprehensive review of the various aspects of soil acidity, including the actions of minor elements associated with acid soil.

Thirteen authors contributed to the seven chapters, four of which deal with research on soil acidity and liming in four major agricultural areas of the country. Each chapter includes the list of references used in compiling a thorough treatment of each phase of soil acidity.

Considerable information is included on the major soil series in the four agricultural areas, as well as the need and response of many crops to liming practices.

Soil scientists and others interested in soil productivity will find this monograph valuable as a reference and aid in explaining crop responses to lime.—B. D. BLAKELY, *head agronomist, SCS.*

Conservation for Camp Counselors. BY REYNOLD AND RUTH C. CARLSON. 1967. *American Camping Association, Bradford Woods, Martinsville, Ind.* 74 pp., illus. \$2.00.

One of the better efforts in presenting a conservation emphasis in camping is this small but fact-filled booklet which at long last puts into better perspective the potential for teaching *conservation* rather than mere tree identification on a campsite.

Designed for the counselor working with youngsters in an organized camp, the emphasis throughout is on giving the camper a well-rounded view of natural resources and his relationship to the natural world.

The booklet is based in part on *Conservation in Camping*, which was published 15 years ago as a cooperative project of the Soil Conservation Service and the American Camping Association. Now updated, with a very practical and useful list of recommended publications at the back of the book, it should be in the hands of every camp counselor before he begins a season at an organized camp of any kind.—KATHARINE C. MERGEN, *Information Division, SCS, Washington, D. C.*

New publications

Conservation of Natural Resources. 1967. *Boy Scouts of America, New Brunswick, N. J.* 80 pp., illus. \$0.35. A completely new manual in the merit badge series of the Boy Scouts, this booklet contains much practical information needed by a Scout to earn the conservation of natural resources merit badge, which is now required for Eagle rank. This new merit badge does not replace any others. Among other topics the manual deals in a broad way with the relationships among natural resources, water pollution, community water supply, air pollution, conservation laws, natural resource management, resource agencies and organizations, and resources of the sea.

Multiple-Purpose Watershed Projects Under Public Law 566. BY WATERSHED PLANNING DIVISION, SCS. Rev. 1968. *USDA PA-575.* 13 pp. Facts about multiple-purpose watershed projects—how they get started; how they are constructed, fi-

nanced, operated, and maintained; what the Federal Government does; and what the local people do. This bulletin supersedes PA-392 on the same subject.

Films. BY MOTION PICTURE SERVICE, USDA. Rev. 1968. *USDA Agr. Hbk. 14.* 81 pp. \$0.40. An alphabetical listing by titles, with brief descriptive notes, of more than 300 motion picture films available from the U. S. Department of Agriculture. In the index by subjects, 22 titles are shown under "erosion control," 38 under "soils and soil conservation," and 34 under "water and water conservation." There is considerable duplication.

Community Action for Natural Beauty. 1968. *Citizens' Advisory Committee on Recreation and Natural Beauty, Washington, D. C.* 36 pp. \$0.40. A "guide for citizens who want to participate in practical action to make their communities better places to live in."

Efforts to mobilize people to enhance natural beauty have been especially difficult because the goal itself, beauty, is an intangible not easily defined.

This simple handbook provides practical suggestions on how to get started by reviewing (1) the public and private organizations that could participate and the attitudes of their officers, (2) the

physical conditions and problems, (3) the laws and regulations affecting quality of the environment. It suggests sources of public aid, a variety of projects and activities, and some useful publications. The potential roles of soil conservation districts and small watershed projects are recognized.

Soil surveys

Pierce County, Wisconsin. BY ORVILLE L. HASZEL. 1968. 165 pp., illus.; with maps 4 inches to the mile (1:15,840). Fieldwork by Dale E. Parker, Delbert D. Thomas, and Gordon N. Wing.

Pahranagat-Penoyer Areas, Nevada. BY LLOYD ROOKE, L. N. LANGAN, AND D. G. BAGLEY. 1968. 121 pp., illus.; maps 1.875 inches to the mile (1:31,680).

Sutton County, Texas. BY C. C. WIEDENFELD AND J. DEWAYNE McANDREW. 1968. 33 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Oklmulgee County, Oklahoma. BY W. A. SPARWASSER, VINSON A. BOGARD, AND ODO G. HENSON. 1968. 51 pp., illus.; maps 3.17 inches to the mile (1:20,000).

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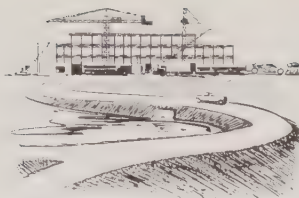
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USDA SOIL CONSERVATION SERVICE
SHEEP ON MANAGED MOUNTAIN RANGE, WASATCH SOIL CONSERVATION DISTRICT

Full-color lithograph prints suitable for framing—one for each state, Puerto Rico, and Virgin Islands—are available from the Superintendent of Documents for \$0.10 each or \$5 for set of 52. Obtain order blanks from your local SCS or post office.

From the Administrator:

Conservation for the total community



In recent years the Nation's soil and water conservation districts have been revising their operations to include increased assistance to urban and suburban communities faced with the need for planning for rapid but orderly growth.

At the same time hundreds of communities have become aware of the services available to them from the trained and skilled technicians of the Soil Conservation Service who work through the conservation districts.

This turn of events, quite natural when the background for them is taken into account, has required the Soil Conservation Service to alter in some degree its view and approach to its overall resource-conservation job.

The Nation's soil and water conservation districts already have at their disposal much information and experience of value to community and county planners. It is obvious that, working together, agencies of local government can accomplish far more than if they continued independently.

The legislation establishing the Soil Conservation Service stipulated that the work to be done by the new arm of the Federal Government would be for the benefit of all the people. Public Law 46 was not a farm bill. It was indeed a land bill, and the first aim of the new bureau was the control of erosion.

Since most of the land needing attention at that time was agricultural land in private ownership, it was natural that we should begin our work there. But it was never the intention of Congress that soil and water conservation be solely a farm program.

Therefore, in our progress toward a goal of conservation use

of all our land, we provide non-farm people also with the information they need for their own planning and development. Much of this information concerns water.

Water, we have pointed out from the beginning, first becomes available for management and use when it falls on land. If we are going to provide for its conservation and for the protection of its quality, there is where we must start.

Our engineers and other professional employees have been involved for more than three decades in helping soil and water conservation districts with problems concerning water. In the early years much of their work was in the design and building of farm ponds in places where they would be successful and most useful and terracing with grassed waterways for the conservation of soil and water and the reduction of sediment. Gully plugs and drop inlets helped with the job, and grass, shrubs, and trees fitted into the effort to repair damage and provide for conservation use of basic resources.

It was following the Flood Control Act of 1944 that the SCS became involved in the protection and development of watersheds on small streams and tributaries. Agricultural benefits were our main purpose, but seldom did we help with the planning of a project that did not have benefits for at least one urban community.

In this process we extended our usefulness as our skills became known and respected. We have helped scores of communities with problems involving the control and management of water, the creation of dependable supplies of acceptable quality, the creation of recreational facilities and the prevention of periodic flooding.

In this work we have gained a reputation as a source of competent professional assistance for those who need it—a reliable combination of the knowledge and skills of the engineer, the soil scientist, and the plant scientist with the talents of the hydrologist, the geologist, the biologist, and the economist in full support.

All of what we do is based on the simple and inescapable premise that soils differ, that water has to be handled according to certain principles, that the technologies relating to soil, water, and plants must fit together, and—this is most important—whatever is accomplished in the conservation use of our Nation's resources must be done by people.

People are the key. We in the Soil Conservation Service do not do soil and water conservation. We work with the millions of land-owners of America who are interested enough to develop conservation plans and, in cooperating with their soil and water conservation districts, to use the knowhow and skill of SCS technicians and others in getting the needed work done.

The problems associated with the changing of agricultural land to homesites, roadways, school grounds, and other community uses are many and complex, but the basic principles of conservation are the same as anywhere else.

We have been improving our technology in the whole field of soil and water conservation for a long time. Techniques are not so much a part of the problem as getting the techniques used. It must be our objective to help the communities of our Nation in their efforts to create the kind of environment they would have for themselves. We shall do this, as in our other work, through the soil and water conservation districts of the Nation.

If we set out to do less the result would be less than enough.

D. A. WILLIAMS



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They cooperated to remove road hazard and develop water supply

Take the need for stockwater, add a dangerous road bridge, and the growing desire for water recreation and you come up with an opportunity for community cooperation.

This is just what happened recently in the community of Edna in Labette County, Kans. The county Technical Action Panel encouraged a cooperative project to build a dam 40 feet high and 256 feet wide at the base to take the road across the stream and to hold back water for livestock.

The idea of cooperating on the project began in 1964 when the county commissioners determined that a county bridge southwest of Edna was unsafe.

At about the same time, Bill McKee and Nat Goodwin, stockmen living adjacent to the bridge,

asked the Labette County Soil Conservation District for technical help in building a dam to supply stockwater to their farms. Soil Conservation Service technicians surveyed the site and realized that a dam built in conjunction with the county road could solve several problems.

An agreement was reached with the county commissioners that the county would contribute \$6,000 and materials to the project equal to the cost of replacing the bridge.

The Agricultural Stabilization and Conservation Service agreed to provide cost-sharing under a pooling agreement on the dam.

McKee, who lives below the dam-site, agreed to provide land for the dam fill. He shared in the cost of pipe and fencing as well. He now receives an abundance of water by

gravity through a 2-inch pipe. McKee plans to build a hog feedlot below the dam.

Goodwin plans to pump water from the 7.2-acre lake to his ranch headquarters. He has fenced the entire lake to keep livestock out. He and his son Tim plan to build a boat dock. Safety signs indicating steep slopes and deep water have already been put up. The lake has been stocked with fish.

Henry Weil gave easements to allow part of the dam to be built on his land.

This reservoir also serves as an emergency water supply for the community. Such an emergency occurred in 1964, when local farmers and ranchers had to haul livestock water as far as 15 miles.—L. JAMES GASKELL, work unit conservationist, SCS, Altamont, Kans. ♦

A dangerous and inadequate bridge (note fender left on bridge railing) was replaced by a wide, straight highway over a multipurpose dam.



1.6 SO3S
OCTOBER 1968

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soil

conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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DEVELOPING THE NATION'S OUTDOOR RECREATION RESOURCES

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Watershed projects
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Private operators
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SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: Canoeing and float fishing on the Current River attract many vacationing visitors to the Shannon County Soil and Water Conservation District in Missouri.

Recreation . . .

When the Food and Agriculture Act of 1962 made outdoor recreation an official concern of the Department of Agriculture, SCS was quick to point out that many fine recreation facilities were already resulting from soil and water conservation.

Farm families and friends were enjoying fishing, swimming, and boating on farm ponds and watershed lakes, and hunting and hiking in improved wildlife habitat.

Planned development: With assigned responsibility for improving outdoor recreation resources, SCS helped landowners and communities plan recreation as a primary income-producing land use.

We asked fieldmen for a sampling of results for this issue of *Soil Conservation*. The response exceeded our space and shows that the country is already reaping a harvest of enjoyment and relaxation from quality facilities that bring increased economic returns.

Suburban project: Because it is a pilot in the rural-urban fringe, where crowded city people can first meet open space, the Rock Creek Project near Washington holds interest for the entire country.

We are pleased to have the story (p. 57) from the man who led the local citizen effort, Col. Lathrop E. Smith. Because he is resting at a retreat in Maine, recovering from a heart attack, Janet Wilson of the Potomac River Basin Advisory Council wrote the draft for him, in consultation by telephone.

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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ORVILLE L. FREEMAN, Secretary of Agriculture

JOHN A. BAKER, Assistant Secretary of Agriculture

DONALD A. WILLIAMS, Administrator, Soil Conservation Service

BEN O. OSBORN, Editor

GEORGIE A. KELLER, Production Editor

Prepared in the Division of Information, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C. 20250

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Key recreation facilities already completed in the Hull-York Lakeland Resource Conservation and Development Project are making the 11-county Cumberland area Tennessee's most rapidly developing family playland.

The influx of visitors and cash, and the experience of working together for common goals, are producing noticeable changes in the attitudes, enthusiasm, and economic status of the local people. State sales tax collected in the area increased 11 percent in 1967 over 1966.

The 2,578,500-acre RC&D Project, named for its two world-famous citizens, was authorized for planning in November 1965. In the course of developing the plan, about 1,400 people participated in some 40 grassroots meetings and offered more than 300 ideas and suggestions for project measures.

The area produced Sergeant

Recreation strikes a spark in land of Hull and York

By Artice K. Booher

RC&D project coordinator, SCS, Cookeville, Tenn.

Cordell Hull and Alvin C. York would be proud of the local people, rural and urban, who have united with single purpose to develop the resources of the rugged mountain country where they grew up. Recreation proved to be the needed catalyst for the Hull-York Lakeland Resource Conservation and Development Project established in Tennessee's Upper Cumberland in 1965. Recreation facilities at Dale Hollow Lake are among the attractions now bringing a flood of visitors to the area.



Alvin C. York of World War I fame and Cordell Hull, secretary of state and father of the United Nations. Here these two great Americans grew to manhood in the midst of rugged natural beauty. Their mettle was tempered by personal hardship and sacrifices and their character enhanced by a resolute determination to contribute to the betterment of their fellow man.

Vacation visitors

These same natural features and pioneer human traits appeal to today's vacation visitor from ultra-modern cities and towns. RC&D committees, searching for a theme that would unite all groups in a common effort, decided to capitalize on the unique natural and human heritage of the area by promoting recreation development.

In early 1967 the Recreation and Tourism Committee published a full-color brochure on the Hull-York Lakeland area listing the recreation attractions available. The venture was financed by local merchants, owners of recreation facilities, and by interested individuals.

Water and scenery

The area is rich in lakes, streams, and scenic grandeur. Dale Hollow Lake, on Obey River near Celina in Clay County, boasts many record catches of bass and trout. The United States record brown trout was taken from the tailwaters of Dale Hollow. Center Hill Lake, on Caney Fork River, is one of the most picturesque of lakes.

These lakes provide game fish that attract fishermen from all over the United States. Their crystal waters are suited to boating and other sports. The shorelines are used by campers all summer.

In addition, hikers may follow trails established by the Indians. One of the project measures is to locate and preserve the numerous archeological sites in the Upper Cumberlands. Historic sites such as Sergeant York's old water mill and the Moses Fisk home are being re-



Activity of the RC&D Recreation and Tourism Committee has helped to increase the number of visitors to Tinch's Old Mill and Museum.

stored and preserved for all to enjoy.

Big game hunting is another popular attraction. Caryonah, a 3,500-acre hunting preserve owned and operated by Lawrence Carey, features wild turkey and Russian wild boar. Carey, a former conservation district supervisor and dairy farmer, has developed his resources into a family operated business that draws visitors and hunters from every state. This year foreign hunters have come from Denmark, Scotland, West Germany, France, England, and Mexico.

Drama and history

The Recreation and Tourism Committee also has promoted the Cumberland County Playhouse. The playhouse is directed by Paul Crabtree, who has written plays for Broadway and the Kraft Theater. Some of the actors are professionals,

but most are local residents of Crossville.

Rustic reminders

Thurman Tinch restored an old water mill and developed a museum that features rustic reminders of pioneer days and early Americana. At the close of the 1967 season, Tinch sent a check for \$87 to the Hull-York Lakeland Association. He said his contribution represented 5 percent of the increase in his income as a result of the recreation-tourism program.

A complete recreation complex called Holiday Hills is being developed near Crossville. A 32-unit motel with a dining room to seat 250 is being constructed on the shores of a beautiful 265-acre man-made lake. Holiday Hills also boasts an 18-hole golf course adjacent to a new airport and a marina for pleasure boats.



Fishing, boating, and water-skiing are popular sports at Dale Hollow Lake.

A group in Fentress County formed a nonprofit organization and negotiated a \$200,000 RC&D loan to finance a recreation facility in this rural area that includes a swimming pool, golf course with clubhouse, and a picnic area.

Influx of campers

Project measures to meet the needs of the ever-increasing numbers of camping enthusiasts are rapidly being installed. A modern camping area to accommodate 50 trailers was completed by Kamp Grounds of America near Interstate 40 in Putnam County during 1967. The Pleasant Grove Trailer Park and Recreation Area at Dale Hollow Lake began operation in 1967.

Other project measures

Other project measures currently being developed include the 13,000-acre Michaux-Yellow Wood Recrea-

tion and Hunting Preserve in Smith and Jackson counties. A group of 130 landowners merged and obtained a charter to formally organize the operation on a sound business-like basis. The landowners plan to develop facilities that will appeal to individuals or large groups.

Renegade Resort, a 30,000-acre wilderness area now under development, will feature a ski slope and lodge as well as a hunting lodge. The resort also plans to sell chalet-type cottages.

Dr. L. R. Dudney, president of the Hull-York Lakeland RC&D Project, summed up the attitudes of local people by saying, "We firmly believe recreation to be a vital link in uplifting our society and in improving the economic conditions of this area and its people." ♦

South Carolina passes bill for RC&D Authority

The Lowcountry Resource Conservation and Development Project needed stronger legal authority to operate programs over a six-county area in South Carolina, and now it's got it.

An act of the General Assembly, recently approved by the Governor, creates the Lowcountry Resource Conservation and Development Authority. It can use the power of eminent domain when necessary; it can secure rights-of-way and easements to install works of improvement; it can accept gifts and grants and exercise other powers to implement measures of the project.

This is the first such authority created specifically to operate a resource conservation and development project. ♦



A city park for the entire county

By John W. Young and Milo E. Thompson

Work unit conservationist and project coordinator, SCS, Cortland and Norwich, N. Y.

A city recreation area in Cortland, N. Y., came into being in response to a locally recognized need for swimming facilities to serve all of Cortland County. The town of Cortlandville, the city of Cortland, and the county of Cortland joined to meet this need through action of the South Central New York Resource Conservation and Development Project.

Officials at the opening ceremonies last July hailed 12-acre Yaman Park as a unique civic achievement. It has capacity for 500 picnickers, 500 bathers, and 350 to 400 cars.

The 4½-acre lake can be used extensively by swimming groups from surrounding communities. The park includes 90 picnic tables and cooking grills, a concession stand, bathhouse and dressing facilities, three major shelters (one of which can be enclosed), 10 cabanas, and two restrooms.

Federal and state aid

Yaman Park started when the Cortland County Board of Supervisors' recreation committee reported a need for swimming facilities

and began studying possible sites. James Yaman, a local realtor, owned a desirable site and contributed 12 acres of land within the city limits that was part of a farm under cooperative agreement with the Cortland County Soil and Water Conservation District.

Mrs. Florence Fitzgerald, chairman of the recreation committee and a member of the Cortland County Resource Conservation and Development Committee, suggested the park as an RC&D project measure. Cortland City Mayor Morris A. Noss approved the proposal, and the city council submitted it to the South Central New York RC&D Steering Committee. The conservation district authorized high priority for Soil Conservation Service help.

The steering committee approved it as one of the first 66 measures to be undertaken in the first year of operation of the project. The RC&D project arranged assistance to the sponsors from state and federal agencies.

SCS provided engineering surveys, designs, and cost estimates for

the swimming area. Application was made to the New York State Conservation Department, Division of Parks, for state financing and for federal land and water conservation funds. The Health Department helped in the health requirements.

The New York State Division of Parks made a grant of \$106,950 for nearly half the cost. The city carried the balance of the construction costs.

A place to swim

Construction of the 4½-acre swimming area started in the early fall of 1967 and was completed by snowfall. It was excavated from a gravelly area. Sand was brought in for the beach. The lake level is maintained by ground water. The Tioughnioga River, flowing nearby, provides an outlet for the water which naturally flows through the pool in the direction of the river. Provision is also made for pumping, if necessary, and for chlorination of the water to meet health requirements. Different depths of water have been provided for varying age groups of swimmers.

A cool day doesn't hinder attendance at the Yaman Park beach. The large bathhouse is flanked by picnic pavilions.

New York RC&D Project links local governments to develop area recreation

Activities to be provided in the immediate future include swimming and swimming instruction, picnicking, fishing, boating, canoeing and boating instruction, and skating during winter months.

Future plans

Mayor Noss said that if adjacent land becomes available in the future, the park will be expanded. Baseball, softball, tennis, and other activities and facilities will be added.

Other state agencies and programs gave their support and assistance to the Cortland sponsors, too. The New York State Beautification Program, through the State Division of Youth, supplied 10 young people for 2 weeks to do clearing and preparatory work before the machines moved in. They also built the 90 picnic tables with quality results.

The State University College at Cortland will teach canoeing and boating. Other local groups contributing include: The Exchange Club, the Kiwanis Club, the Junior Chamber of Commerce, the Rotary



Picnic cabanas line the lakeshore of one of the first completed measures of South Central New York RC&D Project. The second day after opening 1,100 people attended the beach.

Club, the Cortland State Teachers Association, and the Lions Club.

Community benefits

What does all of this mean in terms of benefits to Cortland County and its city, villages, and communities? It means citywide and countywide swimming and swimming instruction, which were previously available on a very limited basis. It means more family picnicking and fishing in addition to that presently available. The area will be landscaped, beautified, and improved in appearance. Employment will be provided for one or two park guards, two to four lifeguards, one receptionist, and one full-time and several part-time maintenance men. ♦

U. S. farmer cooperatives lend a hand overseas

Farmer cooperatives with more than \$1 billion in assets and \$15.6 billion in annual business are in partnership with the U. S. Government to help boost farm production and farm income in overseas countries.

They are showing people in some developing countries how to set up and run their own businesses.

Many other types of cooperatives as well as farmer organizations have had a unique partnership with the Agency for International Development (AID) for 7 years. Together with AID, they have been in 53 countries to help build and strengthen cooperative institutions.



Pheasant hunting 30 minutes from San Francisco

By Hilton Taylor

Work unit conservationist, SCS, Sonoma, Calif.

Hunters in the San Francisco Bay area can get the main course for their "pheasant under glass" dinners before heading to work in the morning.

Pheasant under glass

Two Sonoma County brothers whose grain farm is just 30 minutes away from San Francisco have made this possible. Bob and Fred Dickson operate a commercial hunting facility and continue to farm the same land. They are co-operators with the Sonoma Valley Soil Conservation District and operate according to a conservation plan worked out with the assistance of the Soil Conservation Service.

Originally marshland

The Dickson farm, located on the north side of San Francisco Bay, originally was marshland. The land has an elevation of 2 to 3 feet below sea level. Levees control tides of the bay and keep the streams from covering the land, making farming possible.

The members-only Dickson Hunting Preserve is complete with a clubhouse, dogs, and refreshments. More than 10,000 pen-raised pheasants were released last year on the property. Mike Sutsos, professional hunter, and dog trainer, is in charge of the hunting enterprise.

The land produces prime oats and oat hay harvested for livestock. The hunting enterprise has created few problems. Oats in the California coastal climate is a winter crop harvested after the rainy season in late spring. Hunting follows in the oat stubble in late summer and fall, before time for replanting the next grain crop.

No drainage outlet

The land, being below sea level, has no drainage outlet. The conservation plan calls for 5 miles of open drainage ditches, with pumps, to lower the water table or remove surface water and pump it over the levee into the bay. The plan also calls for shaping and grading 53 acres to eliminate low spots where water tended to collect and interfere with farming operations. Some sections of the levees had to be raised and strengthened to insure holding back tidewaters of the bay.

Plantings for pheasants

SCS currently is working with the owners to establish perennial vegetative cover suitable for pheasant habitat. Plans have been developed for hedgerow plantings to break up the open fields with screens to hold the birds on the area. The plantings will consist of quailbrush (big salt-bush), pyracantha, pampasgrass,

multiflora rose, and blackberries. Trees will be planted on higher ground.

Temporary plantings

A temporary cover of strips or patches of annual plants will be grown at selected hunting areas to attract pheasants. The temporary plantings will consist of sudangrass, milo, field corn, and sunflowers planted to simulate hedgerows.

Because the water on the marshlands is brackish, the Dickson brothers have installed drinking stations, or "guzzlers," to provide fresh water for the pheasants. The stations are metal barrels with drinking troughs having float valves to regulate the water level. Fresh water is hauled to refill the barrels.

Some of the farming operations have to be adjusted in order to accommodate the hunters and pheasants, according to Fred Dickson. But the changes have given the brothers a second crop off the land.

"It is better to have paying guests on the ranch who are interested in sustaining a nearby, pleasant place to hunt than to have unorganized hunting," Dickson said. "Since we organized the club we have had no broken-down fences, accidental fires, litter, or havoc." ♦

On the outskirts of the Nation's Capital . . .

Recreation park draws visitors to Rock Creek reservoirs

By Lathrop E. Smith

Chairman, Montgomery County Soil Conservation District, and president, Maryland State Association of Soil Conservation Districts, Rockville, Md.

Most people who visit and use the Upper Rock Creek Regional Park probably never suspect that it revolves around two flood and sediment control impoundments, sculptured out of the earth with bulldozers.

They see the water-oriented park for its boating, fishing, picnicking, and related recreational opportunities and accept the landscape as Nature's design.

The upper watershed in Montgomery County, Md., has a particu-

larly intimate bearing on the lower reaches of Rock Creek, a 22-mile tributary of the Potomac River. Cloaked in green park land, the creek slices through the fashionable northwest section of Washington, D. C., where foreign embassies, an historic mill site, and the National Zoo all contribute to the creek's atmosphere.

Four books describe Rock Creek as Washington's "largest and finest natural recreation area." To protect this choice park land from the sediment and runoff of upstream urbanization, the Upper Rock Creek watershed, located in the



Fishing and boating are leading activities at Lake Needwood. The "Needwood Queen" is a replica of a Mississippi River steamboat.

Mr. Smith was named 1968 Watershed Man of the Year by the National Watershed Congress.



metropolitan fringes in Maryland, was chosen for the site of two small reservoirs in a project under the Watershed Protection and Flood Prevention Act (Public Law 566). By their very existence, the reservoirs provide two expansive lakes around which a 2,600-acre regional park has been developed.

In addition to providing flood and sediment protection to the downstream reaches of Rock Creek, the purposes of the reservoirs are to develop new recreation opportunities and to reduce the sediment load being transported to the Potomac River. This was a pilot project as a multiple-purpose watershed development which incorporates recreation.

Plans for the project were published in August 1962, on the heels of the passage of the amendment to Public Law 566 providing for federal cost-sharing for recreational development as a project purpose. Now, after more than a year of use the recreational and conservation features of the project have demonstrated harmonious coexistence, and the recreational benefits have come to bear on the community.

The Rock Creek Watershed Association, a citizens group, was instrumental in organizing public sentiment for the reservoirs and in rallying the support of local and federal agencies. The persistent efforts of the Montgomery Soil Conservation District supervisors and SCS staff conservationist obtained conservation agreements with landowners to meet the requirement that more than half the land above the dams be subject to recommended conservation practices.

With this scope of cooperative backing, Rock Creek was eligible for financial assistance under Public Law 566, which requires a display of local support as a qualifying condition. The Rock Creek project is in keeping with Department of Agriculture policy to consider recreation development in each project, carried out with public assistance.

Sponsoring the Upper Rock Creek Project are three local groups—Montgomery County, the Montgomery Soil Conservation District, and the Maryland-National Capital Park and Planning Commission. The Park and Planning Commission has paid for a large part of the development costs for the recreational facilities and provides for the park's maintenance.

The Soil Conservation Service helped the local groups plan the project and supervised construction of the reservoirs. It is providing the federal share of \$1,414,322 towards the total project costs of \$4,237,202, a part of which is earmarked for the basic recreation facilities.

The smaller of the two lakes (54 acres) was named for Bernard Frank, a professional forester and watershed management specialist whose vision was largely responsible for the initial efforts on behalf of Rock Creek. It has not been com-

pletely developed for recreational use, although it is functioning in sediment and flood control.

The other lake, Lake Needwood, was opened for public use in July of 1967. Within 10 weeks the park received 282,000 public visits by people eager to use the dozens of picnic tables and to enjoy the fishing and boating on the lake. Recreationists climb to the top of the 64-foot rolled-earth dam and look out over the lake with no ending in sight. A 30-passenger replica of an old Mississippi showboat makes its rounds on the 74-acre lake.

Lake Needwood has been stocked with crappie, bluegill, and bass. Fishing skiffs, canoes, and paddle boats are available, but due to the limited size of the lake, private boats are prohibited.

Anglers preferring a more secluded fishing atmosphere harvest the trout waters immediately downstream from the reservoir. Each

The boat docks are in a tree-lined cove.





Fishing skiffs are available. Motor boats and other private boats are forbidden on the lake.

dam is equipped with a cold-water release to guarantee year-round the low water temperature needed by trout. The principal spillways permit the normal low water discharge to be drawn from the coldest water layer in the reservoir. It is hoped that the coldwater release will extend the fishing season, which has previously ended with the onset of hot weather.

The release was also rigged so that water leaving the lake takes a short fall to allow it to pick up oxygen and thereby assure a sufficient oxygen supply for the aquatic life immediately downstream. To improve the stream for trout fishing, shade-producing cover, deeper pools, and a rocky labyrinth will be established below both lakes.

Apart from the celebrated reservoir structures, a well-planned program for land treatment within the watershed has been of tantamount importance to the overall success of the project, as well as in assuring uninterrupted recreational use.

The 25 square miles that drain into the two structures is predomi-

nantly rural farmland and woodland. The upper watershed, however, marks the threshold of urban sprawl which, in its path, has dried up many of the creek's sources and buried watercourses under a burden of sediment. A study of "then and now" maps showing comparable portions of the creek's watershed indicates that 50 percent of the natural streams have disappeared since 1913.

Because the scenery and the recreational attractions created by the lakes provide prime attractions to home buyers, builders have everything to gain by practicing soil conservation which keeps the lakes clear. The local soil conservation district and SCS technicians are working together to assist developers to apply protective measures.

Montgomery County, a project sponsor, was the first locality in the country to establish a meaningful sediment-control program, adopt it as policy, and enforce it where necessary. In another of its roles, the county has been enforcing an adequate zoning code so that overdevelopment of the watershed does not take place.

The recreational uses of the reservoirs vary to meet a wide range of user interests. The area around one lake is laid out for "high density" recreation and the other for "low density," passive activities.

For the recreationist in search of relaxation, there will soon be available an 18-hole golf course, a nature center, and additional foot trails. Needwood Mansion, the one-time hideout of John Singleton Mosby—Gray Ghost of the Rebel cavalry—is located on the park grounds and is scheduled to undergo partial restoration.

For the active recreationist, tennis courts, riding stables, and athletic areas are being developed. Already completed is a visitors' center overlooking the lake, notable for its glass-enclosed circular lounge laid out around a hooded fireplace—evidence of the park's intended winter use. ♦

1969 farm census to be taken by mail

The 1969 Census of Agriculture will rely heavily on the voluntary responses of farmers and ranchers to questionnaires sent through the mail, rather than on interviews by paid enumerators.

The Census Bureau has already tested the new procedure and believes that it will not only be more economical but will provide better data than previous censuses.

A test mailing to about 18,000 farm addresses in two states early in 1968 indicated that returns may range from 85 to 95 percent. Data for the remaining 5 to 15 percent will be obtained by followup procedures. Response is required by law.

The mail method allows farmers and ranchers to complete the questionnaire at their convenience, within a reasonable time, and to use their records as needed. This should result in more accurate answers than are sometimes possible in face-to-face interview.

Much of the statistical information for 1969 will cover all farms in all counties and will be comparable to data for 1964 and earlier census years. Some items will be reported only for farms with sales of \$2,500 or more.

The definition of a farm in the 1969 census will be the same as in 1964 and 1959. Places of less than 10 acres will be counted as farms if 1969 sales of agricultural products are at least \$250. Places of 10 acres and more will be counted as farms if sales amount to at least \$50.

USDA representatives who serve on the Bureau of the Census Advisory Committee on Agriculture Statistics are Dr. Harry C. Trelogan, administrator, Statistical Reporting Service, and Carl P. Heisig, deputy administrator, Economic Research Service.—J. THOMAS BREEN, *chief, Agriculture Division, Bureau of the Census.* ♦

Cotile means fun to thousands of people who enjoy the outdoors. They are flocking in droves to the 1,775-acre lake and 80-acre recreational area in the Bayou Rapides Watershed Project in Rapides Parish, La.

The project is located in the heart of the state in the rich Red River bottom lands. It got underway in 1957 when the Rapides Parish Police Jury joined with the Lower West Red River Soil and Water Conservation District to sponsor the 97,000-acre project.

Besides providing recreation, Cotile Lake is designed so water can be let out when needed to irrigate more than 10,000 acres of crop-

By James Loe

Work unit conservationist, SCS, Alexandria, La.

land. Four low-level weirs are built in the 27 miles of Bayou Rapides waterway which cuts through the fertile farmland of the parish. Water behind the weirs also provides places to fish from the banks of the bayou.

Like most of the 21 projects approved for construction in Louisiana, local people matched Soil Conservation Service funds on a

50-50 basis to finance the watershed project. They did this by voting a 4-mill parish-wide property tax to raise \$2½ million over a 10-year period.

The Cotile recreation area opened for business in August 1966 only 1 week after the project's dedication. The police jury operates and maintains the area.

"The first thing we did was to set

The camping area at Cotile appeals to all members of the family.



Watershed project lake and adjoining area offer wide range of activities



Above, the sandy beach with backdrop of pines is graced by comely bathers. At center, the ladies strike out on their own for the open water. Below, the floating docks are a center of activity.



rules and regulations," Fielding James, president of the jury, said. "One was an entrance fee of \$0.50 a car plus \$0.50 for trailers. We also set a \$1 fee for launching boats and \$1 for campers."

The jury did not allow fishing the first year after the lake was stocked by the Louisiana Wild Life and Fisheries Commission. Other rules were set regarding water sport safety, camping, and swimming.

Cotile boasts more variety for recreation than most fun spots. Boating and skiing are popular on the 400 acres of open water. There is fishing from a 143-foot floating pier. Both fishing and hunting are popular on the entire lake area. One area has real beach sand and a modern bathhouse.

Some 2.7 miles of hard surface roads wind through the rolling recreation area that overlooks the lake. Trailer parking spots equipped with running water, electricity, garbage disposal, and cooking pits, are built along the roadsides.

One area designated for camping is equipped with water, lights, and garbage disposal, plus a play area for the kids.

The roads also are lined with picnic tables, cooking pits, and be-

low-ground garbage cans. Campers sleep under the stars, pitch tents, and use trailers. Other features include a pavilion, observation shed, trailer refuse disposal, and comfort stations.

In 1967 more than 127,000 people paid nearly \$20,000 to enjoy the outdoors at Cotile. This money was turned back into the project for caretakers' fees and for general maintenance. Through July of 1968 more than 80,000 fun seekers came

to Cotile, and more than \$15,000 was taken in from entrance fees. "We think attendance will climb to more than 150,000 this year," James said.

Activities at Cotile have stimulated the economy of the Hot Wells community 15 miles from Alexandria. A building boom is on its way and businesses are springing up all around the area. Land values have jumped to nearly \$1,000 an acre, and sales from property around the

lake are expected to add more than \$5 million to the community's economy during the next few years. One hundred fifty homes have been built in the Cotile area, and 12 new businesses have been established during the past year.

Cotile Lake and Recreational Area is yielding a crop that cannot be eaten or worn but is one that brings happiness to thousands and pleasant memories that linger long after the people have gone home. ♦

Small dams satisfy a big thirst in Tunisia as water for many uses flows from reservoirs

By Frederick E. Keeter

Civil engineer, SCS, Stillwater, Okla.

Multipurpose ponds are being constructed as the answer to many different water needs in central Tunisia where the rainfall is less than 20 inches annually, and most of it falls during the winter.

The Soil Conservation Service has a team of technicians, working principally in the Oued Marguellil watershed, to assist Tunisia in the

development and utilization of its land and water resources. The major water needs are for domestic and livestock uses and for irrigation. The dams, being constructed in the upper part of the watershed, also provide flood storage.

In this area, a single dug well or spring usually supplies domestic water for as many as 20 families

living in a square mile. Often a family must walk as much as 3 miles for water. The women carry the water in clay jars or goatskin bags. The same water supplies are used also for livestock. The animals are driven up to 10 miles to water. As water becomes low in wells and springs in the hot summer, use by livestock is forbidden.

Each planned reservoir will provide water for domestic use, as well as for other needs. Filter systems will be installed in many of the reservoirs. The new ponds will provide a more adequate supply for the sheep, cattle, goats, donkeys, mules, horses, and camels.

The irrigation of a small summer garden is seldom possible with the limited amount of water in wells and springs. Each dam being constructed is designed to irrigate from 10 to 30 acres of garden and summer forage crops.

Many of the ponds are located to stop stream channel erosion by preventing overfalls from working their way into precious cropland above. A sediment pool is provided in each pond to reduce silt damage to productive bottom lands.

Building dams to include all the multipurpose features in each calls for care in their location. Soils and foundation investigations are made to determine site characteristics.

Tunisia has adequate soil laboratories to assist in these determinations. A mobile core drilling machine is used to investigate the foundation at each site. ♦

A Tunisian labor force adds rock riprapping to the front slope of a dam. The dam is made of compacted earth with rock and cement in the principal spillways.



Taking the measure of outdoor recreation resources

By Charles G. Phillips

Soil conservationist (recreation), Resource Development Division, SCS, Washington, D. C.

Soil and water conservation districts and cooperating federal and state agencies have completed on-the-ground appraisals of recreation potentials in more than a thousand counties in a nationwide program sponsored by the National Association of Soil and Water Conservation Districts (NACD) and the Department of Agriculture.

They plan to complete the job in another 745 counties before January 1, 1970, and eventually to cover some 2,000 counties that have recognized opportunities for recreation development.

The study of potentials was undertaken after districts had completed an inventory of existing facilities, both private and public. NACD sponsored the inventory in 1965-66 as the first step in coming to grips with the growing demand for outdoor recreation facilities.

Obviously, the next step after finding out what facilities already exist in an area is to determine the possibilities for additional development, both as to kind and quantity, and to analyze the potential market. Then, the community and individual landowners can make wise choices and proceed with confidence in establishing new facilities in a business-like manner.

SCS and other USDA agencies worked with NACD in devising a uniform procedure for appraising recreation potentials (described in *Soil Conservation*, October 1966). After a period of testing this system and training fieldmen, state and other agencies helped the districts make the appraisals.

In each case, the procedure involves gathering and interpreting for a specific area data on soils, topography, climate, scenery and

scenic areas, natural areas, historic areas, existing water areas, potential water-impoundment sites, wildlife habitat and wildlife population; size and distribution of the human population, their ages and occupations, income levels, and proximity and access to the area; and the rural ownership and land use pattern.

These factors are noted separately as to their contribution to 12 standard kinds of recreation developments previously recognized in the inventory of existing facilities; namely, (1) vacation cabins, cottages, and homesites; (2) camping grounds; (3) picnic and field sports areas; (4) fishing waters; (5) golf courses; (6) hunting areas; (7) natural, scenic, and historic areas; (8) riding stables; (9) shooting preserves; (10) vacation farms and ranches; (11) water sports areas; and (12) winter sports areas.

The result is a numerical score for each kind of recreation development indicating that its potential is "high," "medium," "low," or "none" in a national system of comparison. The findings express the group judgment of knowledgeable people in the area, usually including the district governing body, the USDA's Technical Action Panel, and other representatives of federal, state, and local agencies, and organizations.

The information gained during the appraisal is published to serve as a guide to individuals, organizations, agencies, and local units of government in planning either private or public recreation developments.

District governing bodies are finding the appraisals useful in supplementing or revising their long-

range programs. They often indicate that certain kinds of recreation developments have little or no potential within the district while others formerly overlooked offer attractive opportunities for development. Their long-range programs and annual plans of operation can be revised accordingly.

Resource conservation and development projects and other broadscale efforts to improve the rural economy make good use of the inventories and appraisals in planning.

For example, the plan for the Northeast Mississippi RC&D Project gives the development of vacation cabins, cottages, and homesites high priority on the basis of the appraisal of recreation potentials, just completed. Although the potentials for this type of recreation facility are high, it ranks low in the inventory of existing facilities in the area.

According to the inventory, fishing waters, hunting areas, water sports, and picnic and field sports areas now rank in that order, with 131, 92, 86, and 74 existing facilities respectively. Considering the potentials indicated by the appraisal, the Recreation, Wildlife, and Tourism Committee estimated that the following new developments would be completed in the project area by 1980: 2,020 vacation cabins, cottages, and homesites, 2,520 fishing waters, 586 hunting areas, 268 picnic and field sports areas, and 166 water-sports areas.

The appraisal also revealed that the project area has 18,736 potential impoundment sites that could hold an additional 77,700 acres of water for fishing and water sports.

In the Northern Great Lakes Region, the appraisals are being used to develop framework programs for broad areas to promote recreation enterprises with the greatest potential.

The Ozarks Economic Development Region Commission and the Arkansas Planning Commission are using the appraisals in the development of comprehensive plans and programs.

Arkansas developed a statewide summary of the appraisal for use in statewide planning and development of resources.

The appraisals of recreation potentials provide bankers, land developers, realtors, and other investors guidance in selecting the types of outdoor recreation developments most likely to succeed. They are useful also to businesses that depend on the patronage of tourists and vacationists, such as motels, gift shops, and restaurants.

The Chambers of Commerce in Alabama are using the appraisals in promoting recreation and tourism throughout the State.

The appraisals provide district governing bodies a tool to use with their individual cooperators and with cooperating agencies to stimulate interest in the kinds of recreation development with the most potential for success.

In Maryland, short appraisal reports are being issued in each county. Several counties are issuing more detailed publications primarily for use by individuals, agencies, and organizations concerned with planning recreation developments.

Under the influence of inventory and appraisal information, farmers, ranchers, small towns, and county governments, with assistance from SCS and other agencies moving ahead to meet the needs of an estimated 130 million Americans seeking recreation in the outdoors this year. The Soil Conservation Service provided technical assistance in establishing or expanding

more than 40,000 recreation areas and facilities during 1968.

During the same period, 345,000 acres of farmland was converted to recreation and wildlife use. Since 1962, well over 5 million acres have undergone such conversion.

Recreation facilities are also being established in many watershed projects. As of June 30, 119 watershed projects in 33 States included 140 public recreation devel-

opments. These facilities when completed will provide an estimated 81½ million user-days annually of water-based activities such as fishing, boating, and swimming. About 85 reservoir sites are planned for development for public recreation use in the 5-year period 1968-72. In addition watershed project reservoirs provide the nucleus around which hundreds of private recreation enterprises are being developed. ♦

Scout camporee stimulates conservationists

Tennessee conservationists and Boy Scouts trade information for inspiration each fall when the Scouts of the Tuckaleechee District of the Great Smoky Mountain Council gather at a weekend Conservation Camporee.

In October 1967, the fourth year for the camporee, the boys camped at Lambert Lake, near Maryville, Tenn. During the day, the Scouts working for the Conservation of Natural Resources Merit Badge went to a farm to work on soil and

water conservation practices. The boys divided into groups and seeded a waterway, studied soils, laid out a pond, and observed land use and conservation practices.

Other scouts worked on merit badges in wildlife management, weather, and forestry. Soil conservationists of the Soil Conservation Service and specialists of state conservation agencies helped the boys satisfy their merit badge requirements.—T. J. LONGWELL, *soil scientist, Knoxville, Tenn.* ♦

Boy Scouts at a Tennessee Camporee spread mulch on a grassed waterway they helped fertilize and seed while earning their conservation merit badge.



More forage for cattle and deer will grow on 17,000 acres of public and private land in Delta and Montrose counties, Colo., because of a joint effort by rancher Harold Porter, the Delta Soil Conservation District, and the Bureau of Land Management (BLM).

The Porter Ranch lies on Roubideau Creek southwest of Delta. Porter owns about 3,000 acres and has grazing privileges on about 12,500 acres of land administered by BLM.

Under a working agreement between the Delta District and BLM, SCS conservationists assisting the district and BLM personnel worked jointly with the rancher to prepare long range plans covering both his private and allotted public land.

BLM personnel and the rancher developed a plan for the public land. The rancher, with technical assistance from SCS, developed a plan for the private land. These two plans were then brought together into one overall management plan for the entire ranch.

Porter, who has a cow-calf opera-

Private and public range combined in plan for coordinated management of forage

By E. David Sharman and Gene Vecchia

Soil conservationist, SCS, Delta, Colo., and area manager, Bureau of Land Management, Montrose, Colo.

tion, was interested in a yearlong grazing operation on a sustained yield basis. He and BLM worked out a spring-fall grazing program on 12,500 acres of public land and 1,200 acres of private land in the allotment.

This area was broken into four pastures through the use of natural barriers, such as canyon walls, and by fencing. Three pastures will permit a rest-rotation program in which each pasture will receive spring use one year, fall use the next, and no use the next. The fourth pasture is too small to fit into the rotation plan and will be used each year in late fall. Water

facilities were planned for each pasture to provide a more even distribution of grazing.

Most of the public land is covered with pinyon-juniper trees. One area was treated 10 years ago by chaining down the trees and seeding grass. Native and introduced grasses were given a chance to increase and have more than tripled in production.

Other areas that have deep soils and good potential for vegetative growth will be given similar treatment. Strips of trees 75 yards wide will be left around each of the chained areas for wildlife cover and natural beauty. The chained areas

Grass is almost absent from the pinyon-juniper range (left) that will be cleared and seeded under the conservation plan. On an area that was chained and seeded 10 years ago, blue grama and crested wheatgrass are well established.



will be seeded to crested wheatgrass and browse plants, such as four-wing saltbush and mountain mahogany.

The pinyon-juniper areas are part of the winter range for deer and other wildlife. The rest-rotation grazing program, leaving strips of pinyon-juniper cover, will improve the area for both wildlife and livestock use.

Porter, with SCS assistance, then developed a plan on his private land to carry his cattle through the winter and early spring. Summer range is provided by a grazing per-

mit on the Uncompahgre National Forest, thereby completing the year-round grazing cycle.

About 400 acres of private land will be irrigated. In order to eliminate the need for leasing pasture, as in past years, Porter plans to use the irrigated land for pasture and hay production.

The combination of private and public land, including both range and irrigated pasture, and all managed according to a coordinated plan of seasonal use, will result in a more stable and profitable livestock operation. ♦

From scrub oak to pine: a forest recreated

A former world wide golf equipment salesman, Thomas C. Robbins, picked the Sandhills of Moore County, N. C., for his retirement farm and converted most of his 135 acres to woodland by planting thousands and thousands of pines.

A cooperator with the Moore Soil and Water Conservation District, he follows a conservation plan that guides his woodland development and provides for a rotation of fescue and crotalaria with tobacco on his cropland.

In 1964, Robbins had 42 acres under cultivation and 93 acres of woodland, mostly scrub oak and hickory of low commercial value, gum, and a scattering of shortleaf, loblolly, and longleaf pine. Today, he has only about 4 acres of hardwoods. Some 2,000 yellow poplar seedlings are making good growth, and about 80,000 pines from seedlings to 9 inches in diameter occupy land where scrub oak once grew.

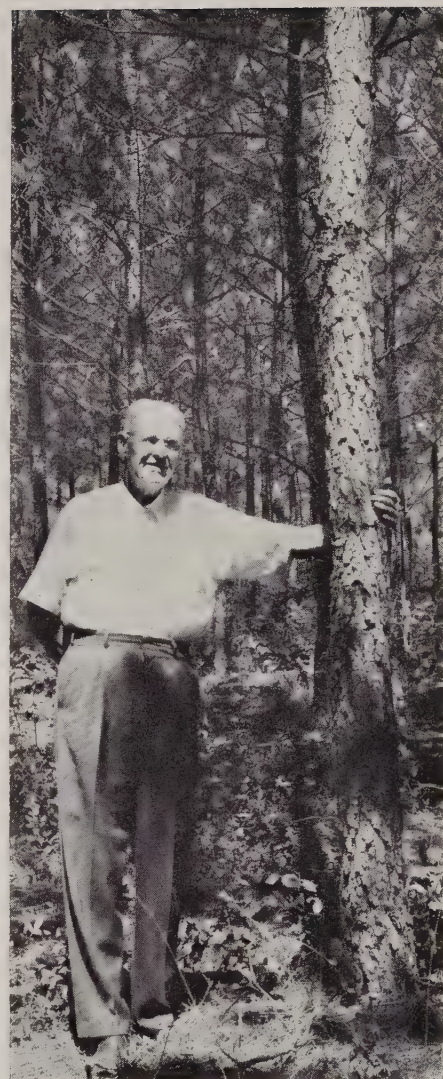
In 1955, he cleared the turkey and blackjack oak from an abandoned field of $4\frac{1}{2}$ acres and planted it to loblolly pine. He cleared 36 acres in 1957, and planted this land to pine in 1957-58. For 12 years he has been clearing and planting. Many of the hardwood stumps have been poisoned with a chemical to

prevent sprouting. Some pruning of pine is done each winter.

Thomas Robbins made an intermediate cutting in 1967 in the first stand planted in 1955. The best trees were being left, using the "D+" system of spacing. According to this guide for southern yellow pine, the number 6 is added to the diameter in inches of existing trees to determine proper distance in feet to their nearest neighbors for optimum growth. Thus, if the best trees in a stand are 6 inches in diameter, proper spacing would be 12 feet.

SCS conservationists marked two 1/10-acre plots demonstrating the D+6 principle of spacing. A tally of the two plots indicated that 6 cords per acre, worth \$36 on the stump, could be cut and 11.2 cords per acre, worth \$67.20, would be left, making a total value of \$103.20 per acre on the stump. A 10 percent reduction for defect was made in the computations. Another thinning can be made in this stand after 6 years.

Besides his timber and tobacco crops, Robbins harvests bobwhite quail that afford him and his dogs much pleasure every year. He knew pine thickets would produce little food for quail, so he has selected sites for wildlife habitat improve-



Thomas Robbins stands by a tree in his first planting of pine made in 1955. The dominant trees average 7 inches in diameter breast high after 12 years.

ment and planting. Today there are more birds than ever on his land.

He also has a lake and a pond, both stocked with bream and bass. —WILLARD K. KELLER AND PAUL R. BRITT, *work unit conservationist and soil conservation aid, SCS, Carthage, N. C.* ♦

Soil conservation districts

Soil conservation districts blanket the Nation. They now include about 99 percent of the farms and ranches and more than 95 percent of the agricultural land. ♦

Travis S. Branch, whose father-in-law "80 John Wallace" became a legend as one of the first Negro cowboys to drive cattle into Texas, is now one of the outstanding cooperators of the Mitchell Soil and Water Conservation District at Colorado City, Tex.

Branch works with 8,820 acres of farm and ranch land in one capacity or another. He owns 1,880 acres, and 2,240 acres in an estate in which his wife, the former Hettie Wallace, has an interest. The estate owns another 4,480 acres which is leased to a rancher, and Branch recently bought a farm which is leased to a farmer.

Conservation is a regular part of operations on the land Mr. Branch runs and is a part of the rental agreement on land operated by other people. Branch signed a Great Plains Conservation Program contract on his land in January 1961 to help establish a complete conservation program. The ranch and the farm leased out both have a Great Plains Conservation Program contract.

Grassland management is an im-

Historic Texas ranch adds another chapter with Great Plains Conservation Program

By A. V. Sheppard and Nolan W. Bird

Work unit conservationist and soil conservation technician, SCS, Tahaha and Colorado City, Tex.

portant part of Branch's conservation program. He has 10 acres of irrigated coastal bermudagrass and 30 acres of Johnsongrass for tame pasture. Watering facilities have been installed on rangeland to get proper grazing distribution so the grasses can gain vigor and density.

Sorghums and cotton are the principal crops grown in rotation on the cultivated land. Crop residues are left on the soil surface until about April 1 each year to control wind erosion.

Cost-sharing under the Great Plains program is helping to replace inadequate terraces and to construct new systems on all sloping land.

"80 John Wallace" bought his first land while working as a cow-

boy for the Clay Mann cattle outfit, whose "80" brand stuck with him as a part of his name the rest of his life. Soon after, school and railroad land were opened for sale, and he homesteaded and bought two sections. After 14 years working as a cowhand and learning many secrets of successful ranching, "80 John" decided to go out on his own. To his original purchase, he added 12½ sections of good land. When he died in 1939, he was the owner of 14½ sections of land, 600 head of good cattle, a modern 8-room house, barns, lots, and corrals.

Today, Travis Branch has the added benefit of successful conservation practices which ranchers have been applying for more than 3 decades. ♦

Travis Branch made several improvements in this water-supply system with the help of Great Plains Conservation Program cost-sharing. The windmill, left, used to supply livestock water, had inadequate storage and the overflow caused a mudhole. On the right, Mr. Branch has built a reinforced concrete storage tank and drinking tank with a concrete apron and a float valve to prevent overflow.



Meetings . . .

Recreation and Parks for leisure society

The 1968 Congress for Recreation and Parks, October 13-17, in Seattle, Wash., spotlights America's rapid evolution from a work-oriented to a leisure-oriented society.

Sponsored by the National Recreation and Park Association, the annual convention has as its theme, "Crisis, Challenge, Change," which reflects the mounting public demand for improved and expanded park recreation and conservation services.

More than 4,000 lay and professional recreation, park, and conservation leaders from all over the United States and several foreign countries are expected to attend, and delegates will participate in 42 educational sessions.

Some of the session topics are "New Innovations in Continuing Education;" "Citizen Participation: A Challenge in Involvement;" "The Role of the Public School in American Recreation;" "Inner City—Suburban Relationships;" "Conservation and Interpretive Programs;" and "Computer Application."

Forestry group considers man and his environment

"Man and His Environment" will be the theme at the annual meeting of the American Forestry Association on October 13-16, at Portsmouth, N. H. Panel discussions will be held on "Forests, Past, Present, and Future in New England," and "Pesticides and Environment."

Two students from the University of Missouri will discuss "Youth Looks Ahead." Rabbi Jacob Weinstein of Chicago will give an address on "Wilderness Is Our Salvation," and Dr. Paul Dudley White of Harvard University a talk on "Health and Recreation."

Three field trips will be held after the meeting.

Commerce Executives to discuss generating greatness

The American Chamber of Commerce Executives will discuss "Generating Greatness" as the theme of its annual meeting October 6-9, at Portland, Oreg.

The topics will be "Generating Greatness Through Understanding of the New Generation and Our World," ". . . Through Understanding Your Job," ". . . Change in Ideas and Techniques," ". . . Present and Past," and ". . . The Road Ahead."

Dates and places

October 6-9, American Chamber of Commerce Executives, Portland, Oreg.

7-10, American Mining Congress, Las Vegas, Nev.

7-10, National Association of State Foresters, New Orleans, La.

13-17, Congress for Recreation and Parks, Seattle, Wash.

13-17, American Park and Recreation Society, Seattle, Wash.

13-17, National Recreation and Park Association, Seattle, Wash.

13-16, American Forestry Association, Portsmouth, N. H.

23-27, Association of Engineering Geologists, Seattle, Wash.

27-31, American Forest Products Industries, Washington, D. C.

27-Nov. 1, National Association of Travel Organizations, Las Vegas, Nev.

31-Nov. 3, Sprinkler Irrigation Association, Coronado, Calif.

November

10-13, National Association of State Universities and Land Grant Colleges, Washington, D. C.

10-15, American Society of Agronomy, New Orleans, La.

10-15, Soil Science Society of America, New Orleans, La.

11-13, National Forest Products Association, Vancouver, Canada.

11-19, National Grange, Peoria, Ill.

17-23, National Reclamation Association, Oklahoma City, Okla.

18-22, American Water Resources Conference, New York, N. Y.

23-27, National League of Cities, San Diego, Calif.

24-26, National Association of Farm Broadcasters, Chicago, Ill.

Million acres needed for new powerlines

Around a million acres of land in east central, north central, and far west regions of the United States will be needed for the construction of an estimated 44.8 thousand miles of extra-high-voltage transmission lines in the 8-year period from 1968-75 to meet projected power needs, according to the Federal Power Commission.

In just 1 year (fiscal 1966—the latest data available) about 1½ million acres of land was required for 15.5 thousand miles of new extra-high-voltage lines.

These estimates include only acreage used for lines with a capacity of 345,000 volts or higher and do not cover land used for additional thousands of miles of lower voltage transmission and distribution lines. ♦

Plant material centers study and develop grasses and legumes

When soil conservation began to be emphasized in the 1930's, adapted grasses and legumes were lacking for some of the jobs to be done.

More and better planting materials of the few kinds in common use were needed by farmers and ranchers who began applying conservation treatment to their land. It was early apparent that the problem of planting materials would need special attention if grassland agriculture was to play its proper role in soil and water conservation.

In a widely cooperative program, 20 plant materials centers were established by the Soil Conservation Service.

These centers have three functions: (1) To assemble, evaluate, select, and increase grasses and legumes for use in soil and water conservation; (2) to determine reliable cultural and management methods for their use, and (3) to get proved materials into production by farmers and ranchers, and commercial growers. ♦

Review



Outdoor Recreation: Community Action Guide for Public Officials. 1968. *National Association of Counties Research Foundation, Washington, D. C.* 10 unpagged booklets, boxed; illus. \$1.00.

A series of 10 booklets, developed in cooperation with the Bureau of Outdoor Recreation, gives local officials and community leaders guidelines for a comprehensive outdoor recreation program. The guides should be useful to administrators, park and recreation directors, county attorneys, planners, public works directors, and others assisting local governing bodies with recreation development.

The series includes: (1) Planning, (2) Legal Aspects, (3) Organization, (4) Staffing and Consultants, (5) Areawide and Multigovernmental Opportunities, (6) Financing, (7) Technical and Financial Assistance, (8) Land Acquisition, (9) Water-Based Recreation, (10) Citizen Support.

Case studies are used throughout the series to illustrate problems and the applicability of the guidelines.—CHARLES G. PHILLIPS, *Resource Development Division, SCS, Washington, D. C.*

Rural Recreation for Profit. BY CLODUS R. SMITH, LLOYD E. PARTAIN, AND JAMES R. CHAMPLIN. 1968. 2d. ed. *Interstate Printers and Publishers, Danville, Ill.* 319 pp., illus. \$6.95.

The second edition of this practical handbook, the only one in its field, comes only 2 years after the original (reviewed in *Soil Conservation*, October 1966.) Exhaustion of the first printing in such a short time shows the keen demand for information in this new field of endeavor.

An additional chapter by Lloyd E. Partain, assistant to the SCS administrator for recreation, on "Lo-

cating an Outdoor Recreation Business," gives explicit instructions for evaluating natural resources and analyzing the potential market. It describes the procedures worked out by the Soil Conservation Service in cooperation with the National Association of Soil and Water Conservation Districts for making an inventory of recreation facilities and appraising recreation potentials in conservation districts (see p. 63).—B. O.

Manual of Outdoor Interpretation. EDITED BY JOE J. SHOMON. *Natl. Audubon Soc., New York.* 104 pp., illus. \$3.00.

The need for nature appreciation and "an outdoor conscience" as a basis for the voluntary practice of conservation by every citizen is the philosophical basis of this treatise on the new art of "outdoor interpretation" assembled by the head of the National Audubon Society's Nature Centers Division.

After a survey of general principles, separate authors in individual chapters take up in historical succession the nature interpretation programs of the national parks, national forests, wildlife refuges, and state and local parks. The more recent development of nature centers such as the Audubon Society sponsors, outdoor laboratories at public schools, natural areas, and camps are also discussed.

Not the least appealing feature of the attractive book are the many fine photographs, most of them by the editor.—B.O.

The Freeway in the City. BY URBAN ADVISORS TO THE FEDERAL HIGHWAY ADMINISTRATOR. 1968. *Government Printing Office (U. S. Department of Transportation).* 141 pp., illus. \$3.00.

Prepared as a report to the Secretary of the new Department of Transportation, this document analyzes the problems of planning highways through urban areas and recommends principles for allaying some of the conflicts that so often plague freeway construction.

An independent group of planners, architects, landscape architects, and engineers was named in 1965 by the former Federal Highway Administrator of the Bureau of Public Roads to make the study and prepare recommendations.

The report takes as its premise that "the urban freeway of the future cannot function only as a transport facility but must become an essential element in the redesign of old cities and the establishment of new ones." The 170 specific recommendations aim at achieving the twin goals of moving people and goods and at the same time serving and enhancing the total environment of the city itself.

Many of the same principles and recommendations are equally valid in planning, locating, designing, and building highways in the suburbs and open country.—B. O.

New publications

Tillage Methods to Reduce Runoff and Erosion in the Corn Belt. BY J. V. MANNERING AND R. E. BURWELL. 1968. *USDA Agr. Inf. Bull.* 330. 14 pp., illus. \$0.15. Recent developments in tillage methods help to offset the increased erosion hazards of continuous row crops. Although greater use of fertilizer and higher plant populations in modern farming increase residue production, they do not eliminate the erosion hazard. Minimum tillage, mulch tillage, ridge tillage, contour listing, and interrow seeding reduce soil and water losses while row crops occupy the soil. Although most of these practices are more effective when the row crop follows a sod crop, they are also beneficial when row crops are grown year after year.

Youth Power. 1968. *National Youth Conference on Natural Beauty and Conservation.* 830 Third Avenue, New York 10022, 21 pp., plus illus. An evaluation of the results of the 1966 National Youth Conference on Natural Beauty and Conservation prepared under contract by Science Research Associates, Inc. Several examples of community action by young people are described and some conclusions drawn about the kinds of support needed and the motives that lead to successful participation.

A Selected Bibliography on Special Districts and Authorities in the United States, Annotated. BY BENJAMIN NOVAK. 1968. *USDA Misc. Publ.* 1087. 57 pp.

Governmental Response to Urbanization: Three Townships on the Rural-Urban Gradient. By ALVIN D. SOKOLOW. 1968. *USDA Agr. Econ. Rpt.* 132. 58 pp. \$0.45. A comparative study of three Michigan townships extending westward from Lansing: one suburban, one semirural, and one rural.

There was a gradual and somewhat linear decrease in urban characteristics away from the core city. The local governments had responded to urban growth by adopting new and expanding services and by changing their patterns of finance and administration, each significant step usually following a flurry of political activity. The sequence of changes followed a consistent pattern, the local governments moving from regulatory to facilitative programs, from minimum to maximum levels of finance and administration, and from stable to changing formal structures.

Ponds and Marshes for Wild Ducks on Farms and Ranches in the Northern Plains. By WADE H. HAMOR, HANS G. UHLIG, AND LAWRENCE V. COMPTON. 1968. *USDA Farmers Bull.* 2234. 16 pp., illus. \$0.10. To attract wild ducks on ponds and marshes that contain water throughout the year is necessary. This bulletin gives the requirements for improving and building ponds and marshes for ducks. Along with this are suggestions for selecting and planting duck foods and for conservative hunting in the Northern Plains.

Soil Erosion and Sedimentation on Federal Lands: Montana. 1968. *USDA, Soil Cons. Serv.* 39 pp., charts and tables. A report prepared in response to a formal request to the Soil Conservation Service from Senator Lee Metcalf of Montana. Federal land agencies in the state cooperated by providing information about areas under their administration. The report concludes that the percentage of federally owned land needing treatment and feasible to treatment closely parallels the needs on private land.

A Toposequence of Soils in Tonalite Grus in the Southern California Peninsular Range. By WILEY D. NETTLETON, KLAUS W. FLACH, AND GEORGE BORST. 1968. *USDA Soil Surv. Invest. Rpt.* 21. 41 pp., illus. This study demonstrates the influence of topographic position on soil development and mineral weathering in an environment of marked alternation of wet and dry seasons.

Availability and Use of Health Services—Rural-Urban Comparison. By MARTIN KRAKOWSKI, MICHAEL WERBOFF, AND BERNARD HOFFNAR. 1968. *USDA Agr. Econ. Rpt.* 139. 26 pp., illus.

Employment in Appalachia: Trends and Prospects. By THEODORE E. FULLER. 1968. *USDA Agr. Econ. Rpt.* 134. 53 pp. An analysis of 79 areas grouped by size of population center.

Agricultural Policies in Europe and the Soviet Union. 1968. *USDA Foreign Agr. Econ. Rpt.* 46. 59 pp., illus. Reviews policies likely to have an impact on the level or composition of agricultural production in Europe and the Soviet Union, or on U. S. agricultural exports.

Northern New England Vacation Home Study, 1966. 1967. U. S. Dept. of Interior, Bur. of Outdoor Recreation. 12 pp., illus. Study to develop measures of the extent to which occupants of vacation homes participate in outdoor recreation.

The Middle Missouri. By BUREAU OF OUTDOOR RECREATION. 1968. U. S. Dept. Int. 103 pp., illus. \$1.25. A study of the outdoor recreation potential of the middle Missouri, made at the direction of the Senate Committee on Interior and Insular Affairs.

The Effect of Taxes and Public Financing Programs on Local Industrial Development. By THOMAS F. STINSON. 1968. *USDA Agr. Econ. Rpt.* 133. 24 pp. A survey of the literature.

Zoning for rural areas. By ERLING D. SOLBERG. 1968. *USDA Leaflet* 510. 7 pp. Slightly revised from 1962 edition.

Land Exchange in the National Forest System. 1968. *USDA PA-821.* 12-page folder, illus. Need for exchanging of private and public land in the National forests along with two maps showing ownership before and after exchange.

Rural Zoning, People, Property, and Public Policy. By WILLIAM J. BLOCK. 1967. *USDA ESC-563.* 32 pp. Discusses some of the controversial aspects of rural zoning, what it can do and cannot do, and what's ahead for rural zoning.

Soil surveys

Wright County, Minnesota. By RUSSELL J. EDWARDS. 1968. 140 pp., illus.; maps 4 inches to the mile (1:15,840). Field survey by Robert A. Luth, Edmund R. Meir, Woodrow W. Anderson, Paul R. Nyberg, Robert C. Munter, Alex S. Robertson, Grenfall F. Harms, H. R. Cline, Russell J. Edwards, Rouse S. Farnham, Milo Harpstead, Richard G. Wirth, Roland R. Larter, Larry Adams, and John E. Foss.

Matanuska Valley Area, Alaska. By DALE B. SCHOEPHORSTER. 1968. 67 pp., illus.; maps 3.17 inches to the mile (1:20,000). Fieldwork by Dale B. Schoephorster, James A. Dement, John A. Ferwerda, Robbie L. Flowers, Orville L. Haszel, James H. Lee, Wilford J. Sheehan, and Charles M. Thompson.

Winneshiek County, Iowa. By KENNETH K. KITTLESAN AND RAYMOND I. DIDERIKSEN. 1968. 225 pp., illus.; maps 4 inches to the mile (1:15,840). Fieldwork by Kenneth K. Kittleson, Kenneth C. Hinkley, Herbert D. Holdorf, Earl J. Kerker, and Robert C. Russell.

Gray County, Kansas. By BOB I. TOMASU AND WILLIAM E. ROTH. 1968. 59 pp., illus.; maps 3.17 inches to the mile (1:20,000).

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



America The Beautiful—Alabama

USDA SOIL CONSERVATION SERVICE

MULTIPURPOSE LAKE ON FORMER PASTURE, CLAY COUNTY SOIL CONSERVATION DISTRICT

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From the Administrator:

Conservation on Recreation Areas



A new kind of land use—recreation—has come into prominence in the past decade. But too few landowners and resource managers recognize the hazards associated with what once was regarded as nonuse or a very minor secondary use of land.

Positive conservation measures are fully as necessary on outdoor recreation areas as on cropland, grazing land, or woodland. Here, as elsewhere, each acre must be used within its capability and treated according to its needs. Recreation use creates its own kind of special conservation needs for each kind of land.

There is particular need for effective conservation practices to safeguard public parks, picnic sites, playgrounds, trails of all types, and other areas frequented by more and more people in pursuit of wholesome leisure and recreation.

Conservation district supervisors and professional conservationists have a responsibility to encourage land owners and operators to develop recreation resources. But their responsibility goes far beyond that. They should assist in every way possible to assure that basic natural resources are protected while providing high quality recreation opportunities.

Basic to adequate protection and sustained safe use of recreation areas is comprehensive planning. Such planning requires the team, or inter-disciplinary, approach, just as it does for land dedicated to other primary purposes.

The plan must take into account not only the needs and desires of the users but a realistic knowledge of soils, engineering, plant and animal life, and facility design, layout, maintenance, and operation.

People with such knowledge, or in a position to obtain the necessary information, may be found in most localities. Some of them are employed in the Soil Conservation Service serving soil and water conservation districts in nearly every county. They should become a part of the planning team for all recreation developments of concern to cities, counties, multi-county areas, or regions of the country.

The soil conservationist has the responsibility of interpreting soil survey information and engineering data and recommending conservation treatments and practices that apply to recreation land.

SCS personnel should encourage high standards and quality facilities. Low initial costs may result in greater expense over the long run. This is especially an SCS responsibility in cost-shared recreation developments in watershed projects. Good recreation plans should not be finite but should be flexible and “open-ended” to permit changes to meet changing needs.

The managers of recreation areas and facilities, whether public or private, must be willing to accept the responsibility for limiting the amount of use to the level for which they were designed or the innate capacities set by nature. Otherwise, there is great danger of destroying the very resources that attract visitors in the first place. This may sometimes be difficult for public areas because of political pressures, but it must be done.

Camping areas, for example, can quickly deteriorate into outdoor slums if those in charge lack the courage—or the willingness to forego extra income—to put up the “no vacancy” sign when no vacancies exist.

An alternative is to provide adequate “overflow” areas to accommodate excess patronage beyond normal design capacity. When planned, designed, and maintained properly, overflow areas need not detract from the regular facilities and will help protect the natural resource.

In recreation areas of all kinds—including parks and wilderness areas—motor vehicles and horses should be restricted to the facilities designed to accommodate them. Nothing will destroy an area faster than concentrated traffic, whether by wheel or hoof. Some of the choice vacation lands are extremely fragile and can stand only limited trampling or grazing. A few strategically located barriers in the form of plantings or structures can do much to control damage.

Another example of the need to be really alert about conservation problems in the recreation use of land is the effect of the growing use of snowmobiles. This new type of vehicle has captured the fancy of outdoorsmen to the extent that in some areas it has become a nuisance to other people and a hazard to the land itself.

Additional trails, both private and public, are needed to safely accommodate snowmobile traffic. Ski areas must be avoided, and trails should be designed to protect the soil and its vegetation, provide for the safety of the participants, and minimize trespassing and property damage.

The key to good recreation planning is common understanding among the technical experts of different disciplines and the representatives of different interests. This involves communication, fact-finding, evaluation of pertinent data, discussion, and decision-making on the part of those in authority. The process requires calm consideration of all the alternatives—often with a lot of “give-and-take” for the good of all concerned.

D. A. WILLIAMS



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Conservationist with a camera

Enrollment in a nature course as a child sparked an interest that has developed into a 20-year recreational hobby of nature photography for Mrs. Harriet Phelps of Middletown, R. I.

Mrs. Phelps worked 10 years as a professional portrait photographer. The desire to express her interest in nature with the camera gradually began to consume her time. Her main interest is wildflowers, but she photographs other subjects in their wild settings, such as rocks, logs, and stumps.

One of her first goals was to photograph all of the wildflowers of Rhode Island. She questioned Dr. Elmer A. Palmatier, professor of botany at the University of Rhode Island. He listed 1,700 wildflowers in the State. She filmed all of them and incidentally found a few extras.

"I believe I have walked every swamp, marsh, and woodland in Rhode Island to obtain these pictures," Mrs. Phelps said.

Her collection from all parts of the country pictures 3,000 species and varieties of wildflowers.

An ardent conservationist, she is a cooperator with the Eastern Rhode Island Soil and Water Conservation District. On her 17 acres she has developed a wildlife marsh, planted 6,000 conifers for Christmas trees, and plans to complete an acre pond.

Recently, she acquired a 140-acre



In interpreting the beauty of nature through the lens of her camera, Mrs. Harriet Phelps has photographed more than 3,000 varieties of wildflowers.

property in Vermont. It is being developed as a showcase of conservation. Mrs. Phelps plans to locate her studio there. She has also established a soil and water conservation plan on land she owns in South Carolina.

Mrs. Phelps has served in several offices with the Garden Clubs of America, including those of program chairman and director. She is

also active in the New York Botanical Gardens and the Norman Bird Sanctuary of Middletown, R. I.

Through the lens of her camera, Mrs. Phelps alerts the public to the beauty of nature and the need for conservation. In her view, nature in all of its splendor is an irreplaceable resource.—ELMER E. OFFERMAN, resource planning specialist, SCS, Storrs, Conn. ♦

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DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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WASTE DISPOSAL ON FARMLAND

Principles and examples

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: Cattle grazing on a farm in the Berkshire Soil Conservation District of Massachusetts are fenced out of the stream fed by springs in the nearby Berkshire Mountains.

Cycles . . .

As we learn more about them, we find the multiple ills of air and water pollution involving the land, and land use practices, in ever more complex ways.

We begin to see some glimmer of logic in the disorderly picture when we understand it in terms of the universal systems of cycling materials in nature.

Pollution problems arise when our technology blocks the channels of conversion from the organic to the inorganic state and stranded "waste" materials pile up to foul our environment.

This is the way SCS's environmental land use specialist, Bill Bullard, explains (p. 75) the success of waste disposal on farmland. The methods work because they make use of the natural "disposer" organisms in the soil to put organic materials back into the ecological cycle.

Examples: Reports from fieldmen show that feedlot operators are leading the way in devising practical systems of waste disposal.

The three examples in this issue (p. 78, 81, and 84) have this in common: They distribute dissolved nutrients in irrigation water onto fields where the nutrients are promptly reused in desirable production rather than being left to build excess fertility in streams and lakes.

Wrong number: If you are keeping a file of *Soil Conservation*, you may want to change the volume number on the cover of your copy of the September issue. It should be Volume 34.

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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ORVILLE L. FREEMAN, Secretary of Agriculture

JOHN A. BAKER, Assistant Secretary of Agriculture

DONALD A. WILLIAMS, Administrator, Soil Conservation Service

BEN O. OSBORN, Editor

GEORGIE A. KELLER, Production Editor

Prepared in the Division of Information, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C. 20250

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Natural filters for agricultural wastes

They can be used for the disposal of city sewage effluent too

By W. E. Bullard, Jr.

Resource Development Division, SCS, Washington, D. C.

Farmers and processors of farm products are finding that the waste products of their operations generally can be returned to the land with less hazard to the environment than when discharged into streams.

By completing the natural cycle of growth, death, and decay on the land where crops are produced, they make use of a legion of "disposer" organisms in the soil capable of decomposing organic wastes on site. Streams are not naturally supplied with disposer organisms in such abundance and are easily overburdened by concentrations of organic materials not originally produced there.

A big problem in returning agricultural wastes to the land is in distributing the materials widely and evenly enough to permit adequate breakdown and absorption into the disposal site. The answer seems to be to use the effluent, after diluting or removing excess solid matter, for sprinkler irrigation.

When sprayed on grass or crops, the effluent serves the dual purpose of irrigating and fertilizing the

field. Thus, agriculture has the potential means of disposing of its own wastes and preventing or reducing environmental pollution.

Some city sewage departments also are experimenting with the disposal of effluent through farm irrigation systems.

Numerous pollutants originate from agricultural sources: sediment, pesticides, nutrients from fertilizers, nutrients from crop residues and animal wastes, and organic materials of a high biological oxygen demand from the processing of animals and plants for food, oil, and fiber.

Pollution may also arise from natural movement by erosion or leaching of materials from forest, range, or cropland, or from the discharge of processing wastes into streams and lakes.

The wastes may be harmful in streams because they are toxic or carry disease organisms, or they may provide nutrients that cause excessive growth of bacteria, algae, and higher plants. Surface waters in many areas are rich enough naturally that a small addition of nu-

trients triggers algal "blooms." Respiration of these plants uses dissolved oxygen, sometimes to the point that fish suffer. Heavy growths shade out other aquatic life and make the affected waters unattractive and even unsafe for human use. On decomposition, the plants create bad odors and tastes, discoloration, and sometimes toxins in the water and deplete the dissolved oxygen supply.

Another kind of waste is involved—the loss from the land of nutrients taken up from the soil and used in production of crops, livestock, and wood. It is sound ecology to return this material to the land and put it into the production cycle again.

The soil contains in its top 6 or 8 inches a system of biologic "disposers" that evolved naturally to handle the breakdown and recycling of organic materials derived from the soil. These disposers include insects, mites, snails, worms, protozoa, bacteria, fungi, algae, and higher plants.

The feeding and digestive processes of the larger lifeforms break down available food material physically and chemically. They decompose proteins to ammonia, metabolize carbohydrates to carbon dioxide, and discharge water by respiration.

In addition, there are hundreds of millions of bacteria and other microscopic organisms per cubic inch of soil. Some produce ammonia, some use it, some convert it to nitrites and nitrates. Others break down cellulose or oxidize sulfur. The resulting substances are taken up as food both by the microorganisms and by the higher plants that have roots throughout the soil.

In normal undisturbed grassland or brushfield or forest, these organisms decompose fallen leaves and twigs, animal droppings, and dead animal bodies and return the nutrients to the soil. If given the opportunity, they can do the same for the residues of agricultural production or domestic sewage.

These disposers are adaptable; they can take care of many synthetic as well as natural organic materials and can become adjusted to coping with highly toxic pesticides. Also, the disposers have a large and flexible capacity to deal with changes in volume of the materials presented. The mass of soil particles provides a tremendous surface area on which the myriad swarms of disposers live and work.

Organic wastes create problems and cause damages when they accumulate and cannot be recycled in the natural decomposition system. Animal wastes no longer are commonly spread in solid form onto cropland and plowed into the soil but tend to be accumulated in large volumes at considerable distance from sites of application for disposal. Drainage from such concentrations sometimes is a source of excess nutrients in streams.

Most other wastes, particularly those associated with processing or with sewage treatment, involve large quantities of water as a solvent and carrier. Liquid wastes can be handled by pump and pipe in continuous transport to any desired distribution point. Many paper companies, food-processing industries, and city sewage treatment plants move their waste effluents by pipe to places where they can be safely applied to the land.

Various methods of distribution have been tried, but spray irrigation appears to be the best.

Five years of successful operation of a system of spray irrigation for disposal of sewage treatment plant effluents on both cropland and woodland at Pennsylvania State University has shown the way for other communities.

In this demonstration, the detergents not removed by ordinary sewage treatment were broken down for their phosphate content by the soil organisms. The phosphate was almost entirely removed—and much of the nitrate, too—as the effluent percolated down

through the top 8 inches of soil.

Spraying was done by overhead sprinklers at an application rate of 2 inches per week. Growth of both clover and woodland was increased, and some tree species were favored over others. Masses of ice accumulated around the sprinklers at times in the winter, but there was no run-off problem nor any change in the working of the system. There was no odor at any time. In this case, any possible disease hazard was removed by chlorinating the effluent before spraying, and the soil removed much of the chlorine.

Larger communities also are investigating this method of disposal of nutrient-rich sewage treatment plant effluents. Cleveland, for example, cannot discharge its effluents into Lake Erie and finds that drying and burning produces air pollution and is too costly to be practiced. The city is now experimenting with irrigation of coal strip-mine spoilbanks with effluent and sludge containing 4 to 5 percent solids.

Results of the tests look good; the slightly alkaline effluents modify the acidity of the spoilbanks, and this, plus the nutrients added, stimulates recovery of vegetation. The water percolating through the spoilbanks is cleared of disease organisms and appears as a safe addition to streamflow.

Chicago, too, is looking into similar methods of disposing sewage effluent and sludge on the land.

The practice recommends itself to communities where the discharge of treatment-plant effluents has brought about enrichment of streams and lakes. The outflow from lagoons as well as treatment plants may be taken care of by spray irrigation. When water in a lagoon seeps down from the bottom, it is not acted on by the disposers, which occur mainly in the well-aerated upper soil layers.

Pulp and papermill companies in several states are disposing of their waste effluents by spray irrigation on woodland and pasture

and so avoiding stream pollution. The effluents have a high biological oxygen demand but carry nothing toxic. They may contain fiber, sugar, and other dissolved organic substances, sulfur compounds, inert clay fillers, and titanium oxide whiteners. The soil and its population of disposers reduce the biological oxygen demand to insignificance.

Rates of application are usually equivalent to six times normal precipitation or more. From one operation in Ohio applying the sprayed waste to a steep forested hillside there is at times a small amount of runoff, but it is fairly clean after passing across the filter system provided by the leaf litter and small plant stems of the forest floor.

In another Ohio operation where rolling fields of grass are sprayed, there have been winter accumulations of ice around the sprinkler heads but, as at Pennsylvania State University, it melted largely from beneath and soaked into the soil with no runoff and no occurrence of odor. Sale of the hay crop just

about paid for the operating cost of this disposal system.

In Wisconsin, cheese factory waste waters sprayed onto pasture have increased grass growth and have created no serious odor nuisance. Odors were more noticeable at one operation where infiltration ditches led to sludge accumulations. The waste waters did not include much whey. The whey was sold to other food-manufacturing industries, used as fertilizer, or disposed of by dumping on sandy soil away from residence areas.

In Puerto Rico, sugar mill filter-press cake was dumped into an irrigation canal and disposed of by distributing it back onto sugarcane fields.

In Texas, sewage-treatment plant effluents from 60 cities and towns, and waste waters from several dairies, feedlots, and canneries are used to irrigate more than 20,000 acres.

For 30 years a vegetable-processing plant in New Jersey has used spray irrigation for disposal of waste water and has put about 400

inches a year on the forest acreage set aside to receive the spray. The organic materials have been taken up by the luxuriant growth on the treated area. Ground water has been amply and safely recharged. Similar disposal operations are being carried on successfully by other vegetable-processing factories in Ohio and Michigan.

The system works well, it works well over a wide variety of soils and climates and topography and with a wide variety of effluents. The principle behind these—and no doubt many more—successful operations is that of getting materials produced from the land back onto the land where they can be used again in production.

It is a matter of adapting our needs and actions to the local situation, of working in accord with the particular ecology of the area rather than by upsetting it, and of letting the natural disposal agents do the job they have evolved to do.

Although it may be costly, it is less expensive than the alternatives. ♦

The St. Regis Paper Company at Urbana, Ohio, pipes papermill effluent 2 miles to a farm where it is spread by sprinkler irrigation on a timothy field. The circular white spots at the left are residues of inert material deposited around sprinkler locations.





A 14,000-head beef feedlot uses retention ponds (beyond the pens) to control downstream discharge of animal waste.

Ponds stop pollution from feedlots

Operator complies with Kansas law requiring retention and disposal of animal wastes

By George R. Smith and F. DeWitt Abbott

State conservation engineer and state soil conservationist, SCS, Salina, Kans.

Kansas has entered the cause against water pollution by animal wastes with a law, passed in 1967, that requires detention ponds at feedlots where pollution is imminent.

Pioneer Feed Yards, Inc., of Oakley in northwest Kansas is a large commercial beef feedlot operator that has completed the required dams in accordance with plans approved by the Department of Health.

SCS conservationists serving the Gove County Soil Conservation District worked closely with the management and the health department in planning and installing the system.

Following the specifications of the Federal Water Quality Act of 1965, the state law required that

feedlots register with the Environmental Health Services of the Kansas State Department of Health by April 1, 1968. The law also provides penalties for noncompliance.

About 900 feedlots have registered, according to LaVern R. Heble, acting chief of the Water Pollution Control Section of the department. The health department is in process of site-surveying the feedlots. As of June 20, the department had told about one-third of those surveyed that they did not need water-pollution control facilities.

For those feedlots which do contribute to water pollution, state law requires that a pair of detention ponds be provided to retain runoff. One collects solid wastes; below this, a second pond holds drainage

from the first pond. Feedlots are also required to dispose of wastes from the ponds.

The Pioneer feedlot, covering 100 acres and holding 14,000 head, was established in 1960 near the headwaters of a subdrainage area of Hackberry Creek. The nearest community in the watershed is Gove, the county seat 30 miles downstream. However, ranchers within shorter distances were concerned about the quality of livestock water during periods of low to moderate rainfall when streamflow was insufficient to dilute wastes from the feedlot.

Two sets of dams

Pioneer's lots drained into two intermittent natural draws within the subdrainage area, so it was necessary to build two sets of detention dams. Pipes with slide gates provide controlled drainage of liquids from the solid-waste ponds into the liquid-waste ponds. As the solids settle out, the liquid is drained off the top just below the dam's emergency spillway. This requires careful management by the operator.

The dams themselves are similar

to other SCS-engineered dams. They were built to state health department standards to contain up to 3 inches of runoff from the feedlot, which could be expected from about 3½ inches of rainfall at that location. Heavier rains would greatly dilute the animal wastes in the runoff, so it would not present such a serious problem downstream.

The ponds are flat-bottomed to facilitate removal of solid wastes. Local truckers who remove stockpiled manure plan to do the same with the solid wastes in the ponds. They can have the manure for the taking, and they sell it to local farmers who apply it to irrigated cropland. This manure is especially valuable in spots where a farmer has had to cut away the topsoil to level land for irrigation.

Irrigation with surplus

With an average annual precipitation of only 18 inches, Pioneer Feed Yards can expect relatively little water runoff to accumulate in the liquid waste pond. Large accumulations will be pumped out and distributed by a pipeline sprinkler system on dryland wheat and grassland adjacent to the ponds, owned by the corporation, according to Manager Les Keller. He believes this will be necessary only infre-

quently, as some evaporation will take place.

The soil is a silt loam that will absorb the effluent at a relatively moderate rate. There is 80 feet of this loess material above the nearest ground water leaving little chance for pollution. If there was any danger of contaminating ground water, the bottom of the ponds would be lined with a sealing blanket of impervious material. There is a well immediately below the ponds. It will be monitored periodically.

Manager Keller feels that the operation has a number of safety factors working for it in controlling water pollution. These include: (1) Arid climate; (2) location near headwaters; (3) corporation owning land adjacent and downstream from feedlot; (4) long distance from population center in watershed; (5) deep, moderately permeable loamy soil; (6) program of removal and use of solid wastes, so that they do not enter into the water-pollution picture, and (7) liquid waste disposal on a large acreage owned by the corporation.

The corporation, in recognizing these natural resource factors and in cooperating with state and federal agencies, represents progress in the control of water pollution by animal wastes. ♦

This liquid waste pond has a capacity to catch runoff from the feedlot resulting from rainstorms as heavy as 3½ inches. Howard Cheney, left, SCS work unit conservationist, and Les Keller, feed yard manager, check the water level.



Oklahoma town solves its sewage problem

A low-cost lagoon for Gotebo, Okla., solved a sewage disposal problem that had grown into full blown air pollution about to be compounded by water pollution in a planned reservoir downstream from the sewage discharge.

Concern became critical when officials of the Mountain View Soil and Water Conservation District informed the city council of plans for a flood-prevention reservoir on the stream below where the city's sewage was being discharged. The proposed lake would have a depth of 25 feet and a surface area of 30 acres. Council members realized that their problems might be multiplied by pollution of the new lake.

Interagency action found a solution to the problem. The Gotebo city council met with the conservation district board of supervisors and representatives from the State Health Department, the U. S. Public Health Service, and the Soil Conservation Service.

The State Health Department presented a choice of sewage disposal systems from which the town of 600 people selected the lagoon type as the best suited to its needs.

SCS provided consultive assistance to local engineers in the design, layout, and supervision of construction of the system. This included 500 feet of new main sewerline all costing less than \$4,000. No bonds were voted. There was no increase in bills to the citizens. No state or federal help in financing was asked for or received.

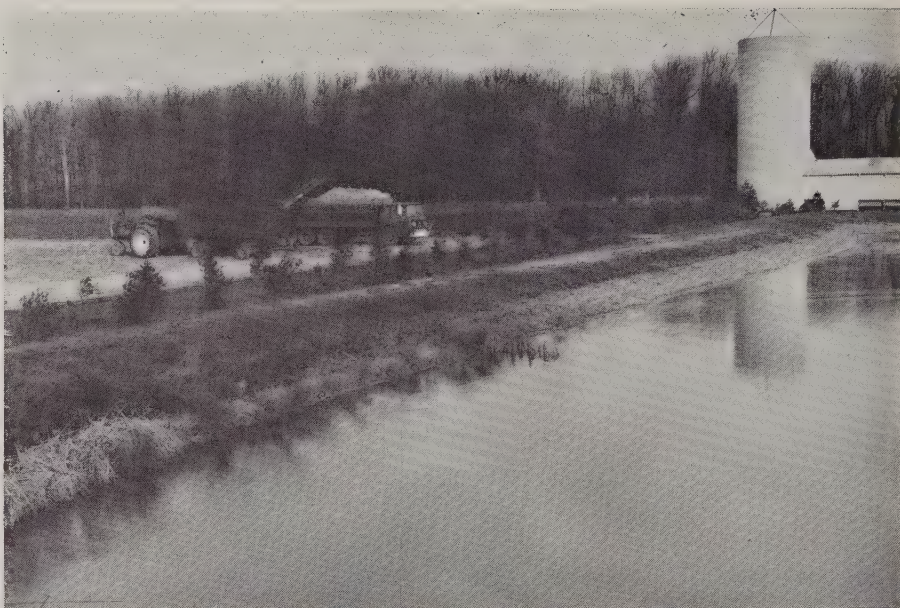
The lagoon has eliminated the air pollution problem with a minimal cost and without adding odor or oxygen demanding nutrients to a reservoir to be built downstream.—

ROBERT E. SMITH, work unit conservationist, SCS, Mountain View, Okla. ♦

Low-priced ponds for high-quality water

By Donald R. Urban

Soil scientist, SCS, Defiance, Ohio



A half-acre upground pond on the Allen Clady farm provides emergency water supply for a 50-cow dairy herd, fire protection, and recreation. A windbreak of white and Scotch pine is planted on the spoil area.

A new design for dugout ponds is overcoming problems of poor-quality underground water and a thick layer of clay subsoil that limit natural supplies of high quality water for northern Ohio landowners.

The new "upground" ponds have low construction costs, they are supplied from drainage ditches or tile systems, and have storage capacity for multiple uses.

Since flat topography makes conventional watershed pond sites scarce items in the Lake Plains area, farmers for years had created ponds by excavating pits. But the reservoirs often created more problems than benefits. Their water level depended on surface runoff from the drainage area. Frequent springtime overflows flooded cropland at planting time. Their shallow depth limited water-holding capacity, often leaving them dry when needed most. Livestock wading into the ponds added silt and pollution to the reservoir. Spoil, piled up during excavation, had to be trucked away, increasing construction costs. Few landowners were satisfied with results.

Moreover, underground water in the area is often contaminated with

sulfur, iron, and salt, making it undesirable for agricultural needs and domestic uses. Complicating the situation, a thick layer of clay subsoil slows water-table recharge.

To offset the problem, Soil Conservation Service engineers designed a dugout-type pond that actually takes advantage of the flatland and heavy clay soil. A low clay dike built around the water-storage area makes use of spoil from the excavation made directly into the clay subsoil. The pond is filled with water pumped from nearby farm drainage ditches or tile systems.

The banked sides increase the pond's capacity with a minimum of digging and reduce the cost of hauling spoil. Surface runoff water is kept out by the dike.

Ponds of this kind have been successful also in areas where lake sands cover the heavy clay. The sand is pushed back, and the dike is built from the clay spoil. The sand is then graded back against the fill.

Most farms in the flat area have drainage systems that can be used. A portable pump and pipe used during wet spring and fall seasons provide ample clear water for the pond. Little or no refilling is

needed during most summer months.

The new ponds should be filled soon after construction. If the new fill is allowed to dry out, cracks develop as the clay soil shrinks. Seepage often occurs where the water level has been allowed to drop or there has been a long delay in filling. For this reason most dugouts are built in late summer and fall so they can be filled during the winter.

The ponds vary in size from $\frac{1}{4}$ to $1\frac{1}{2}$ acres, with a few even larger. Average cost, depending on size, location, and water requirements, is between \$800 and \$1,500. Soil and water conservation district cooperators have built more than 200 upground ponds in this 10-county area in the past 3 years, according to William S. Ufer, SCS area conservationist.

The ponds serve many uses. They provide a reliable source of emergency stock water. Some farmers pipe the water directly into a nearby barn. With proper filter and treatment facilities, a few are used for household needs. Many also serve as a source of water for fire protection.

Recreation, both swimming and fishing, are added benefits easily

included in the pond design. A beach area, dug to a 4- to 5-foot depth and refilled with sand and gravel, provides a swimming area. Diving piers can be added at the deep end of the reservoir. For improved fishing, spawning beds cut into the sides of the pond at a specific depth improve fish production.

Allen Clady's pond in Henry County is a good example of the "upground" design. Clady's half-acre reservoir, constructed in 1960, was dug with a pan and dozer in 80 hours. A total of 5,300 cubic yards of earth was removed and used to form the dike that stands 5 feet above the surrounding ground level. The usual depth of the ponds is 12 feet, but Clady's was dug deeper for greater capacity.

Sides in the reservoir were sloped on a two to one ratio. The outside slopes of the dike were made eight to one in order to use the spoil and make a better recreation area. The finished dike was seeded to *alt* fescue after topsoil from the site was spread over the clay fill. White and Scotch pines were planted on the west bank to form a windbreak for the pond.

Water for the Clady pond comes from a deep open ditch about 250 feet away. A small portable 1-inch pump fills it back to normal in less than a day. "One pumping each spring has done the job," says Mr. Clady.

The upground pond idea has spread beyond farms in the area. Several towns, faced with the same underground water problem, have built essentially the same type of reservoir, but on a larger scale. They are filled during heavy streamflow and used for the primary water supplies for the town.

"The idea is spreading fast," says Area Conservationist Ufer. "More than 60 upground ponds were built last year. Dozens more are planned this year. It's another good example of landowners taking advantage of modern technology to make better use of their natural resources." ♦

Irrigating with animal waste

Sprinkler sewage disposal system for hog feeding facility fertilizes soil without pollution

By Clarence Underwood

Work unit conservationist, SCS, Hermiston, Oreg.

Two conservation-minded brothers in eastern Oregon have solved their problem of animal-waste disposal by completing one of nature's fundamental cycles and putting the material back on the land where it originated.

Stafford and William Hansell pump effluent-enriched water from their hog-raising facility out through a huge sprinkler system onto their grain, hay, and pasture fields.

Result: The crops are fertilized, little odor is noticeable, and no water pollution has been detected.

A safe solution

The Hansells sent more than 22,000 hogs to market in Pendleton and Portland last year. Their use of farm fields for waste disposal enabled them to avoid creating a health or nuisance problem in the community.

The Hansells are cooperators in West and East Umatilla soil and water conservation districts. Their farming reflects their concern for conservation. Although they employ their own professional and technical personnel, they consult with Soil Conservation Service conservationists at each stage of land development to insure that operations will be in line with good conservation standards.

In 1960, the Hansells purchased a former civilian housing facility from the Umatilla Army Depot. It included 57 brick housing units with concrete floors and built-in

water and sewer facilities along with a community sewage disposal system.

They stripped the interiors of the housing units, poured new concrete floors with a 3-foot wide gutter at one side, divided the buildings into 8- by 16-foot pens which can accommodate up to 14 pigs each, and installed velocity-controlled water outlets in each pen.

Streams of water flush animal wastes into the gutter, through the sewer system, and into a lagoon that was part of the original sewage

Sandy soils, reclaimed from desert shrubs, produce an excellent crop of spring barley when irrigated with diluted animal waste. Stafford Hansell checks the harvest prospects.





Rich effluent from hog raising operation is flushed into this lagoon before going to larger lagoon for dilution and application to crops. Sprinklers can be seen operating in the background at right.

disposal system. This 100- by 300-foot lagoon now serves as an initial holding basin. A second holding basin 1,000 by 350 feet in size was constructed to receive diluted waste from the first pond. The larger pond is divided in the middle to allow additional settling of solids.

Water and fertilizer

Effluent is then pumped from the large pond directly into the sprinkling system. Systematic management determines which field gets the liquid fertilizer.

At any one time, the Hansells have about 15,000 hogs. Water use

for cleaning the pens varies from 400 gallons a minute in winter to 1,200 gallons a minute in summer. They have sufficient water to dilute the effluent to the extent desired or to irrigate some fields with water only.

The Hansells irrigate about 500 acres—420 acres with three large circular, self-propelled electric sprinklers on wheels; the rest with solid-set and conventional wheel-move systems. Screens at the pumping station from the second pond eliminate most solids that might plug sprinkler heads.

The Hansells estimate that their

system puts about 5 pounds of actual nitrogen per acre on a field each time it is irrigated from the lagoon. Further dilution reduces this to 2 pounds for some crops. No other fertilizer is used.

The Hansell farm plan includes irrigation water management, a conservation-cropping system, and wind-erosion control measures.

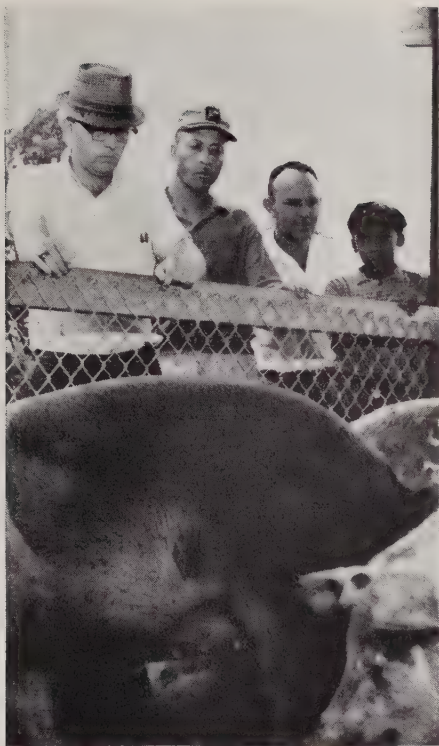
"We plan to irrigate only the root zone of the crop grown," says Stafford Hansell. "To prevent serious wind erosion we wait until our water is there before we prepare our sandy soils for seeding." ♦

Pumping equipment in foreground handles animal waste held in the largest of two lagoons, last stop before fertilizing crops at rates of up to 5 pounds of nitrogen per acre.



Imperial Valley farmers improve irrigation, drainage

Farmers in the Imperial Valley of California, with technical assistance of the Soil Conservation Service and soil conservation districts, installed 634 miles of tile drains during 1967. This brings the total installed in the valley to date to 13,295 miles. They also lined 63 miles of private irrigation ditches and 59 miles of irrigation district ditches to make a total to date of 1,854 miles. ♦



High quality gilts on the Clayton farm helped build his new home. Hyde County FHA Supervisor Thurman Burnette, left; Clayton; County Extension Chairman George O'Neal; and Clayton's son inspect the modern hog operation. The old wooden house, left, where Mr. and Mrs. Clayton and their four children once lived will soon come down and the materials used for a machinery shed for their intensified farming operation. The Clayton family, right, sees a brighter future in their new house with the approval of frequent visitors such as Mrs. Clayton's sister.

A farm family finds new hope with agency help

The Edward Clayton family of Hyde County, N.C., has made full use of USDA help, and they have the evidence to prove it: a new, three-bedroom brick house on their own 100-acre farm and a modern hog operation. A few years ago, Mr. and Mrs. Clayton and their four children lived in a ramshackle house on a mortgaged farm belonging to Mr. Clayton's father.

What's more, like most small farmers, they had to survive the price-cost squeeze and meet the rising expectations of a growing family.

The Clayton's met their challenge with a "complete development program" suggested by three cooperating agricultural agencies. SCS Soil Conservationist T. V. Simmons helped develop a complete water-management system for the farm, The Farmers Home Administration assisted with a financing and money management plan, and the Agricultural Extension Service gave guidance for other farming improvements.

Clayton added a 26-sow hog operation and 6 acres of pickling cucumbers to supplement his in-

come, which had come primarily from corn and soybeans in the past.

He has built one of the most modern hog operations in Hyde County. Included are a sow-holding unit, a 24-stall farrowing-to-finishing unit, a connecting lagoon, and two grain storage bins.

Clayton makes 100 bushels of corn an acre with little difficulty, and he is planning to grow most of his feed. Properly managed, he believes he can clear \$100 annually per sow, which will enable him to pay for all of his farm improvements.

Clayton has installed the water-control system for his entire farm, a prerequisite for cultivating land in coastal Hyde County where the water table is only a few inches below the surface.

In addition to his own land, Clayton is now tending 40 acres which belongs to his mother and another 100 acres which he rents.

"Complete development" has meant more intensified farming, higher income, and better living for the Edward Clayton family. Their future on the farm has become brighter; the appeal of the city has become less alluring. ♦



It's good management to turn a problem into profit . . .

Cattle feeders avoid pollution by using wastes in irrigation

Any time you can solve a problem and turn the solution into profits, it's good management.

That's exactly what the Choquette brothers, Bernard and Edwin, of Upland, Nebr., are doing. They are using animal wastes from their feedlots to irrigate and fertilize corn.

What would be pollution in a stream is plant food in a cornfield.

The Choquettes feed 200 to 300 head of cattle each year in their five feedlots covering about 4 acres. All the area drains into one natural draw that would otherwise go into Thompson Creek, a tributary of the Republican River in the Franklin County Soil and Water Conservation District.

To begin with they pick up the solids and haul them out to be spread on the land. The rest washes down with every rain and is caught in a farm pond. It has an emergency spillway like any well-designed pond should, but it may never be used.

Pond with lagoon

From the pond a special tractor-driven pump picks up the liquid and lifts it 75 feet through an underground line to the edge of the field. The pump is an impeller type designed to handle up to 25 percent solids. Being tractor drawn, it can be moved and set where needed in a matter of minutes.

In the bottom of the pond the Choquettes have dug a lagoon-type pit so there will always be some water available to keep wastes in suspension. But it can be pumped dry if necessary. When and if resi-

dues fill the pit, cleaning is easy with a front-end loader.

A riser at the field outlet permits the material to dump directly into an irrigation lateral or into gated pipe. Each row gets its share just like regular irrigation, except this water is loaded with wastes that didn't pollute Thompson Creek. It irrigates and fertilizes all at the same operation. In this area of friable loess soils it soaks in quickly, where the wastes go right to work making a corn crop.

Soil Conservation Service conservationists assisting the district surveyed and designed the pond just as they would any other farm pond.



Residues from the feedlots in the background wash down into the lagoon at the bottom of the pond. From here they are pumped to fields for irrigation. The impeller-type pump used by the Choquette brothers, Edwin (left) and Bernard, handles fluid containing up to 25 percent solids.





The Choquettes have been cooperators with the district for a number of years, and in 1962 their place was selected as the top conservation farm in the district. They have applied conservation measures to crop and grasslands through a Great Plains Conservation Program

Edwin Choquette places an elbow of pipe in a junction box at the end of an underground pipeline that brings feedlot effluent to the field for use in irrigation.



contract which they completed in 1964.

To amortize in 20 years

"The pollution control system cost us about \$2,000," says Bernard, but we will only have to pump \$100 worth of value from it each year to amortize it in 20 years."

They can put that much value anywhere they want it on the 100 acres of corn any time they want to pump, except when the land is being worked for planting. If it doesn't rain they pump water from their regular irrigation well into the pond and out again onto the land.

The Choquettes and their simple but effective system are way ahead of the Nebraska Legislature, which has recently started pollution control action. Responding to the Federal Water Quality Act of 1965, the legislature created a Water Pollution Control Council within Nebraska's Department of Health. Nine members are appointed: two from the food manufacturing industry, one from agriculture, the secretary of the Nebraska Game and Parks Commission, the director of the Department of Water Re-

sources, a representative of the Nebraska Soil and Water Conservation Commission, and two from municipal governments. The Director of Health is automatically a member. T. A. Filipi is executive secretary of the council.

Inventory of feedlots

In April this year Filipi began the task of inventorying the more than 21,000 feedlots in Nebraska. His office sent questionnaires to be filled in by those feeding more than 300 feeders, 100 beef cows, 100 dairy animals, or 500 hogs. Or, regardless of the number of animals, if the lot is 500 feet or less from a stream it must be registered with the council. Any lot may be registered if the owner chooses. Ultimately nearly every feedlot in Nebraska will fit into one of these categories. Some type of permit system will probably evolve, giving the Pollution Control Council some degree of control over problem areas.

But Bernard and Edwin Choquette aren't waiting for a permit; they already have a system in operation. It solves the problem and helps the corn, doing both jobs at

the rate of 500 gallons a minute. It meets the standards as far as the Nebraska Health Department is concerned.

Nebraska's conservation districts aren't waiting either. At their 1967 state association meeting they passed a resolution urging research into the technical and financial aspects of feedlot waste treatment. They are encouraging USDA agencies to apply going program methods of soil and water conservation to the waste problem.

Water quality and conservation

"Water quality and water conservation are synonymous," thinks Warren Fairchild, executive secretary of the Nebraska Soil and Water Conservation Commission and

member of the Pollution Control Council. "This involves soil and water conservation districts. Sediment caused by erosion is a major source of pollution, too," he adds.

The problem looks even larger when you consider that one cow produces animal wastes equivalent to those of 16 people. A feedlot with 10,000 head of cattle produces the same amount of waste as a city the size of Lincoln, Nebr. Iowa and Nebraska alone feed more than 3 million cattle a year, with wastes equal to the sewage from 49 million people.

News about Choquette's system is spreading into other Cornbelt feedlot states. "We've had visitors and telephone calls from Iowa, Illinois, and Indiana," Bernard says. ♦

Posters reinforce conservation lessons

Grade schools of Blackfoot, Snake River, and St. Margaret, Idaho, have just concluded the 10th annual conservation poster contest as a climax to conservation

study units in the fifth and sixth grades.

Robert Jackson, contest chairman and a supervisor of Central Bingham Soil and Water Conservation

District, said there was 86 percent student participation with 696 posters submitted this year. Large rosette ribbons were awarded to 206 students preparing the best posters. First, second, third, and fourth place winners were named in each of four divisions of the conservation education project.

Of the 31 classes taking part, 24 had 100 percent participation this year.

Posters are judged for effectiveness in promoting conservation, originality, unity of slogan and illustration, and neatness and skill. The judging team is composed of representatives from each sponsor and school district.

The contest is promoted and managed by a committee of representatives from each sponsor and school district. Sponsors include Sunspiced Vegetable Company of Idaho, Blackfoot Farm Bureau, Thomas-Pingree Farm Bureau, Idaho Potato Starch Company, Blackfoot Sugar Beet Growers, and the Central Bingham District. The conservation district supervisor serves as chairman of the committee.

A packet of conservation publications is given to each teacher to be used with school textbooks on conservation. The students study methods of preventing erosion, ways to conserve our valuable water, how treatment of our watersheds affect our water supply, and how practicing conservation affects our present and future standard of living.

After the conservation study unit is completed, students prepare their posters on one or more subjects: Soil, water, wildlife, and forests.—BOYD ARCHIBALD, *soil conservationist, SCS, Blackfoot, Idaho.* ♦

Multiple-purpose small watershed projects

Experience in hundreds of localities demonstrates that multiple-purpose small watershed projects are an effective means for rural and urban communities to deal with land use and water problems. ♦

A teacher from the country of India, Miss Ravitha Derendernath, awards a rosette to Sixth Grade Pupil Edmo Wesley for his conservation poster in the rural division of the Blackfoot School District. Principal Lloyd Broadhead joins in the recognition.





This firing range and other training areas at the fort have been much improved since seeding and other control measures have been applied.

Fort Polk wins conservation battle while training soldiers to fight

Soldiers at Fort Polk, La., not only learn how to fight, but they also pick up some knowledge of soil, water, and wildlife conservation.

Conservation has made the 148,000-acre fort a better place to train, as well as making it produce a good timber crop and provide a bumper crop of wildlife and fish for thousands of GI's and civilians.

Fort Polk was carved out of the hill country of central Vernon Parish. It dates back to 1940 when the threat of World War II created a demand for more grounds to train fighting men. The area was selected because of its rough terrain; the topography is ideal to prepare men to go to war.

Military men at Fort Polk had one goal in mind during World War II days.

That was to turn out well-trained soldiers and lots of them. Shortly after the site was designated, heavy equipment cleared away trees and plowed up grass. Thousands of miles of roads were built. Tanks and vehicle-drawn guns rumbled over the hillsides and more than a half million men tramped the Fort Polk countryside

between 1941 and 1944. When the war was over thousands of acres of Fort Polk land was washing away.

Colonel Herbert Eagan of the Ohio National Guard and John Andrews, professional forester at the fort, along with Camp Commander General Leo M. Kreber, in 1954 recognized the need for action.

"Erosion was so bad that many roads couldn't be traveled," Andrews said, "and most of the training areas were almost unusable. Poor drainage in low areas also was hindering training operations."

Conservation into action

Eagan and Andrews were assigned the job of putting a conservation program into action, so they went looking for help. Eagan, a soil and water conservation leader in Ohio, knew where to look. They signed a conservation agreement with the Calcasieu Soil and Water Conservation District. Soil Conservation Service men, under the direction of Clinton Harris, headquartered at Leesville, helped Fort Polk people draw up a conservation plan.

"In 1961 we really went to work treating the problems," said An-

draws, who now heads up most of the conservation activities in the camp. "This was the time the 35th Engineering Group from Fort Hood came to Fort Polk. These GI's were the first task force to help get our conservation work underway."

Erosion, brought on by tank maneuvers and other heavy equipment traffic, had eaten deep into the sandy soil. Roadbank erosion on the 300-mile road system was the first problem tackled by the 35th. This conservation campaign started with shaping embankments, applying asphalt mulch, and seeding to bermuda and bahiagrasses. Other jobs tackled included shaping and seeding 70 badly eroded firing ranges, many bivouac areas, and several parade grounds. The 845th Engineering Group joined with the 35th to complete many of these conservation projects.

"The area where trainees live takes up over 4,000 acres of Fort Polk's land. Conserving and protecting this area is part of every man's job," said John Andrews.

Erosion that had eaten away at most of the land bordering company barracks has now been elimi-

nated. This 10-year battle was won by seeding grasses and planting shrubs. Each company area is closely supervised in order to stay on top of any recurring erosion.

Many plans were put into action in 1961 when the Department of Defense sent down orders to expand recreational facilities at Fort Polk. They included an 18-hole golf course, unit picnic areas, riding stables, and several ball parks. GI's and civilians worked together to design, clear, and develop these facilities. Today more than 1,500 visitors, plus three times that many military people, use these playgrounds each week.

Recreation and wildlife

Col. Jim Anders, in addition to directing rifle, machine gun, and other weapon training for 30,000 troops, has developed the fort's "open country" into a hunters' and fishermen's paradise. Under the direction of the Louisiana Wild Life and Fisheries Commission, Colonel Anders is putting his wildlife knowhow to work to make Fort Polk a choice hunting ground. About 6,000 soldiers, and double that many civilians, hunted on Fort Polk's woodlands and fields last year. A bumper crop of deer, squirrel, dove, and quail was the reward.

Five ponds are now providing good fishing. More than a hundred acres of open fields are planted each year to browntop millet and other bird food plants and 1,200 acres of roadsides to rye, oats, and wheat for deer.

Timber management methods differ from privately owned woodlands. All woodlands are used for troop activities. Some areas are thinned more heavily to allow ease of troop and vehicle movement, while other areas remain in near natural condition for camouflage and other specialized training purposes.

Timber sales from Fort Polk woodland have climbed to more than \$142,000 each year. This is a



Some of the roads at Fort Polk were almost unusable from erosion until control measures evident here were applied. Work Unit Conservationist Clinton Harris (left) and Forester John Andrews, who helped Fort Polk draw up a conservation plan, look at a recently seeded roadside.



result of reforestation, selective cutting, and fire protection.

"Not only are these trees making money, but they have been beneficial in holding down soil on eroded areas," said Andrews.

Most of the money from timber sales is used for improvements of the post's land.

Fort Polk's conservation program is helping win more than one battle. It keeps pollution-causing soil out of 15 streams that originate on the fort's 184,500 acres. The program also helps keep the rainfall

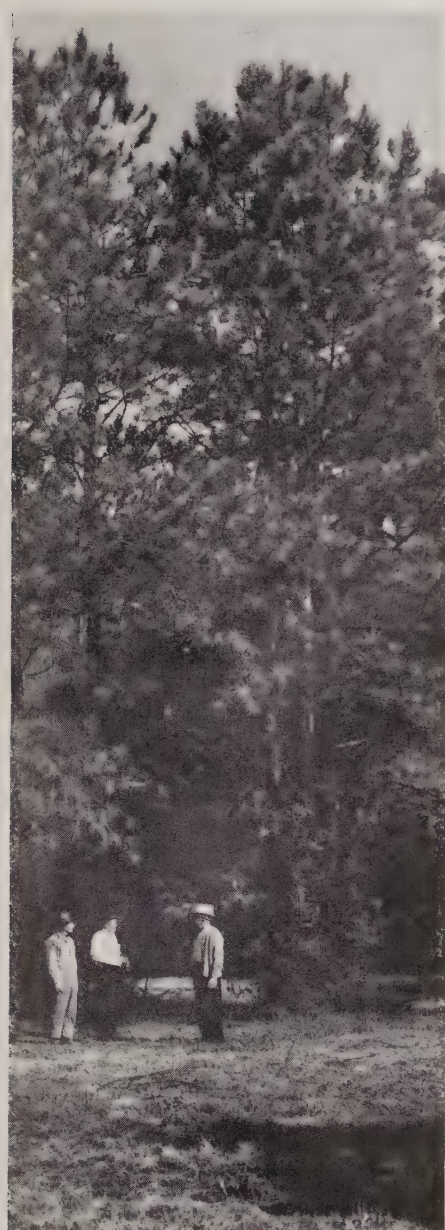
from pouring down barren hillsides and flooding these streams.

"Our main purpose here at Fort Polk is to make fighting men out of boys," says Post Commander Major General Ellis W. Williamson. "Four out of seven Vietnam infantrymen are trained here. But while we are doing our main job, we want to do more. That's to protect the soil, water, and plant resources to create a better place to train men and a better place to enjoy the goodness of nature. Our troops are helping do both." ♦

A nature park with something for every taste

By W. C. Nelms

Assistant state conservationist, SCS, Jackson, Miss.



These woods are filled with loblolly pine as big around as a bear's hug. They are fragrant with yellow jasmine and watered by a creek where old gnarled beeches wet their gray roots and beavers toboggan down the banks.

Here 35 acres are being reserved—set-aside—for walkers, picture-takers, birdwatchers, ball players, naturalists, picnickers, and fishermen. This will be the Philadelphia-Neshoba County Park, just outside Philadelphia, Miss., where clearing and pruning began last February for a recreation area unique so far in the state.

Rack Burt, director of the Philadelphia and Neshoba County Parks and Recreation, says he hopes the park will provide "something for all tastes." Although the park will include such sophisticated touches as three lighted baseball fields, tennis courts, swimming pool, and a community house complete with kitchens, auditorium, and game rooms, Burt wants to keep it as nearly natural as possible.

He is going to plug up the old creek run, thereby impounding about 2½ acres of water, and stock this natural stream with channel catfish. Here, under the towering pines, fishing rodeos can be held. Fishermen can cut their own poles from the feathery brakes of Japanese cane that now line the water's edge.

Animals to see

In time, tame animals—deer, goats, rabbits, and ducks—will be on display in 15 acres of fenced woods. So far the deer consist of four head, donated by Arnold Barrier of the Bond Community and moved with the help of Robert Wagner, Jackson zoo director, to the park's present acre-and-a-half deer pen.

Park Director Rack Burt (left) shows Glenmore Powell, SCS work unit conservationist, and H. S. Mason, conservation district commissioner, where he intends to place one of the picnic tables.

It would be difficult to name all the individuals, agencies, and groups who have assisted the park commission in the park's development.

Working through the Neshoba County Soil Conservation District, the Soil Conservation Service helped develop the overall plan last summer and advised on the use and treatment of land, the location and design of about a mile of all-weather roads, and engineering for a 1,500-foot ditch essential for area drainage.

As the work has moved along, SCS has given technical help with locating and laying out the nature trail, planning woods management, helping to identify plants.

On the outskirts of the beautiful natural-seeded pine forest, Burt plans to place picnic tables "in the creek bends where picnickers will have privacy." Lights have been installed in three baseball fields in preparation for nightly games. There will be trails where people can travel with ease, and a swinging bridge will span the creek.

Showy plants

The woods contain a variety of interesting plants. Red buckeye, rare in this section, bursts into brilliant color in the spring and in the fall yields its nuts for good luck charms. There are dogwood, honeysuckle, and yellow jasmine.

The Soil Conservation Service is providing even more showy plants, tested at the plant materials center near Coffeeville for just such purposes as this—redhaw, flowering crabapple, autumn olive, Armur honeysuckle. Later there will be plants tested for wildlife.

There are beaver colonies in the creek, squirrel nests overhead.

H. S. Mason, chairman of the Neshoba County District, says: "The commissioners are encouraging local communities, as well as private landowners, to develop natural recreation areas like this by using funds available through many different sources. I believe

the Philadelphia-Neshoba Park Commission is planning to take advantage of the Land and Water Conservation Fund."

Before this development there was not even a roadside park in Neshoba County, nor any other park area within 30 miles.

At state office level, Soil Conservation Service now has a conservationist whose speciality is planning outdoor recreation projects. Soil

scientists, engineers, foresters, agronomists, and biologists also provide technical assistance.

The nature park is good soil and water conservation, and something else as well—the conservation of human spirit. Truly, all living mortals need woods to roam in, time to savor blue skies that are especially blue in April, and leaves that unfurl their tender green with comforting certainty each spring. ♦

A farmer's dream come true: a productive farm

With the help of the Appalachian Program, the Macon County, Tenn., farm of Wick and Ruth Knight is changing from idle brown to a growing green.

"We have always dreamed that we would some day be able to clean up the place and get it back into production," Mrs. Knight said, "and now our dream is becoming a reality."

The hill farm of 160 acres, 40 of which were classified as cropland in 1966, is in the headwaters of Long Fork Creek near the Union Camp community and has been in Mrs. Knight's family for four generations. The Knights have owned and lived on it about 15 years.

A gross income of \$2,000 for this

family comes from burley tobacco, a few acres of grain, plus a small plot of a very unusual crop—catnip produced for the Willard Walton Sassafras Products Company. Some years Knight produces a small amount of pepper for the same company.

Early in 1966 the local agricultural agencies cooperatively publicized the Appalachian Program. When Knight heard about it, he went to the local Agricultural Stabilization and Conservation Service office and asked about the program. The Knights' request for assistance was approved by the county committee in March 1966 and sent to the Soil Conservation Service for conservation planning assistance.

The SCS conservationist visited

the farm and saw fields, once used for row crops, scarred by gully erosion. At one time there were six springs, but over the years silt from the gullies reduced the spring flow and left a once well-watered farm without enough livestock water.

Knight decided on a plan that included conservation and development of 49.2 acres for permanent pasture and hay and entered into a 5-year "Appalachian" contract through the County ASC Committee.

The Knights' complete conservation plan called for cropland, woodland, and wildlife land uses and conservation treatments along with pastureland and hayland.

During 1966, Knight completed clearing brush from the hillsides, smoothed eroded areas, prepared a good seedbed, and seeded the 49.2 acres to grass and legumes for pasture and hay. These areas now support an excellent stand of grass. One farm pond was built in early September of 1966 and another planned for later construction.

In April 1967 they bought five purebred dairy cows to start their dairy herd. They plan a gradual increase until they reach a 25-cow-herd.

The entire cost of the Appalachian contract is expected to be about \$4,000. The cost-share approved under the contract is \$2,460. The cost to the Federal Government is limited to \$50 an acre. The Knights are planning to make other farm and home improvements with a loan from the Farmers Home Administration.

"The grass looks mighty good, and we could not have carried out the plan without the help of this program. We just didn't have the necessary money," Knight said. "As a result of this and future increased earnings, we hope to be able to build a new house and make other improvements on the farm," Mrs. Knight added.—ARTHUR G. FUQUA, work unit conservationist, SCS, Lafayette, Tenn. ♦

Mr. and Mrs. Wick Knight, son Wickie, and grandson Scotty look at a newly seeded pasture on their farm. Farm pond in background.





Three months deferment of grazing at the beginning of the season enabled the pasture to right of the fence to gain in growth of grass in comparison to the other pasture which was grazed.

Conservation treatment improves range a third

Under a Great Plains Conservation Program contract, an Atwood, Colo., rancher's investment in conservation measures is paying off.

With three additional wells, 2.5 miles of cross fencing, seeding on 480 acres of depleted range, sagebrush spraying, proper range use, and practicing rotation and deferred grazing, Alex Fiebig reports, "My range can easily handle a third more yearlings."

Formerly, one yearling required 12 acres. After conservation practices were applied, it required 8 acres for a 5-month period. What is even better, Fiebig reports his range is now in better condition at the end of the grazing season than before.

Fiebig became interested in a conservation program because he wanted to do some range seeding. He worked out a conservation plan as a cooperator with the Padroni Soil Conservation District. A Soil Conservation Service conservationist recommended other conservation measures besides seeding.

Before the practices were established, Fiebig had two pastures and two wells, and the remote areas were seldom grazed. Now he says

the extra wells and fencing allow stock to use the smaller pastures uniformly without ever traveling more than $\frac{3}{4}$ mile.

Fencing increased the number of pastures from two to five. Each year he defers grazing of one pasture. This permits the deferred pasture to gain in vigor and reestablish some of the heavily used grasses. Fencing also permits rotation and deferred grazing of the other four pastures. He now has 3,500 acres in good range condition. —CARL G. BETZ, *work unit conservationist, SCS, Sterling, Colo.* ♦

USDA speeds up rural area assistance

USDA has set up the technical action panel structure (TAP) to coordinate its efforts at the field level to serve rural residents.

During the first 7 months of fiscal year 1968 (July 1967 to Jan. 31, 1968), 19,325 county TAP meetings were held, with a total attendance of 113,083; 29,834 from non-USDA agencies.

As a result of these meetings TAP referred 118,138 individuals and groups for outreach assistance. ♦

Rancho de Chimayo boon to RC&D area

Already a popular tourist attraction in the small town of Chimayo, N. Mex., the Rancho de Chimayo restaurant owes its success to the faith of its owner, Arturo Jaramillo, and the encouragement and assistance of the Northern Rio Grande Resource Conservation and Development Project.

Mr. Jaramillo was willing to gamble his money, resources, and credit to start a restaurant featuring native foods at a location off the beaten path. But prospective lenders could see many reasons why such a venture would probably fail.

Then he learned of "this project to create jobs for people in the area" and made a "project measure request" to the RC&D Project Committee. With the endorsement and help of the committee, the necessary financing was arranged from local sources supplemented by a Farmers Home Administration loan for farming operations.

Jaramillo renovated his grandfather's adobe house and converted it into a restaurant. It was a going business from the start and after 3 years has increased the average community income by an estimated \$100,000 a year and the average employment by 20 man-years.

For the past 2 years, the restaurant has had an average monthly payroll of \$2,200 and employs as many as 35 workers during the peak summer season.

Although the restaurant operation is new, the "rancho" has been in the Jaramillo family for many years. The rancho grows all the fruit and chili used by the restaurant.

Arturo Jaramillo says, "We no longer live in the day of miracles, but if you have a project you are willing to work for, the Resource Conservation and Development Committee is here to work with you." ♦

New administrator in January



Kenneth E. Grant

Kenneth E. Grant will become administrator of the Soil Conservation Service upon the retirement of D. A. Williams in January.

Mr. Grant has been associate administrator since March 1967.

Mr. Williams will become a full-time program adviser on water management and development for the Ford Foundation in India on a program to help that country increase food production. He has served part-time in that capacity during the past year and has made several trips to India and to Turkey, Costa Rica, Thailand, Vietnam, and New Zealand as a consultant on soil and water conservation problems.

The new administrator is a native of New Hampshire and was state conservationist in that state from 1959 to 1964, then state conservationist in Indiana until becoming associate administrator.

He received a B. S. degree in agriculture, with a major in agronomy, from the University of New Hampshire in 1941, and a master's degree in public administration from Harvard University in 1964. ♦

Meetings . . .

Soil and crop societies talk of research goal

Three affiliated societies of soil and crop scientists will meet in New Orleans, La., November 10 to 15. They are the Soil Science Society of America, the Crop Science Society of America, and the American Society of Agronomy.

The principal theme of this year's meetings is "Research with a Mission."

There will be 600 to 700 papers dealing with soils and crops and their interrelationships. About 50 of these will deal specifically with soil genesis and classification, but a very large number of the others will be of great interest to those concerned with soil and water management.

Congress of International Society for Rock Mechanics

The Second Congress of the International Society for Rock Mechanics will be held in Belgrade, Yugoslavia, September 21-26, 1970.

More details on the Second Congress will be published in the Bulletin No. 1, which is to be distributed to all national societies, committees, and groups connected with rock mechanics, as well as to all interested in this field of science.

All correspondence should be addressed to: Sekretarijat II kongresa Medunarodnog drustva za mehaniku stena, Institut za vodoprivredu "Jaroslav Cerni," Bulevar vojvode Misica 43, Belgrade, Jugoslavija. ♦

Dates and Places

November 10-13, National Association of State Universities and Land Grant Colleges, Washington, D. C.

10-15, American Society of Agronomy, New Orleans, La.

10-15, Soil Science Society of America, New Orleans, La.

11-13, National Forest Products Association, Vancouver, Canada

11-19, National Grange, Peoria, Ill.
17-23, National Reclamation Association, Oklahoma City, Okla.

18-22, American Water Resources Conference, New York, N. Y.

24-26, National Association of Farm Broadcasters, Chicago, Ill.

December

1-7, American Association of State Highway Officials, Minneapolis, Minn.

1-14, American Farm Bureau Federation, Kansas City, Kans.

2-4, American Seed Trade Association, Farm Seed Conference, Dallas, Tex.

2-4, Newspaper Farm Editors of America, Denver, Colo.

2-4, Agricultural Relations Council, Chicago, Ill.

3-6, Western Forestry and Conservation Association, Seattle, Wash.

6-8, National Association of Manufacturers, New York, N. Y.

7-11, American League of Cities, New Orleans, La.

10-13, American Society of Agricultural Engineers, Chicago, Ill.

26-30, National Association of Biology Teachers, Dallas, Tex.

26-31, American Association for the Advancement of Science, Dallas, Tex.

Technical Action Panel sparks employment drive

A mobile van of the Ohio Employment Service visited communities in Champaign County, and employers in the area made nearly 350 jobs available during a 2-week drive started by the county's Technical Action Panel to get more people into gainful employment.

The TAP organization contains representatives of USDA agencies plus state and local agencies. With coordination of activities through TAP, all mayors of communities in Champaign County and the county commissioners signed proclamations declaring the 2 weeks as "Job Opportunities Days."

Nearly 450 people visited the mobile van; more than half of these were first contacts with the Employment Service. People from outlying areas were sought out. Many were taught how to apply for a job and how to conduct themselves during an interview.

At the last count, 28 percent of those contacted had found a job. —ADRIAN R. ACHTERMANN, *work unit conservationist, SCS, Urbana, Ohio.* ♦

Review



Policy Directions for U. S. Agriculture. BY MARION CLAWSON, 1968. *Johns Hopkins Press, Baltimore (for Resources for the Future, Washington).* 398 pp., charts and maps. \$10.

This book is another of *Resources for the Future's* studies in land use and management directed by Dr. Marion Clawson.

The author states that it has been written in the conviction that the time is ripe for a critical reexamination of long-range agricultural policy. An underlying assumption is that choice is possible for the Nation's agriculture; that public programs are not beyond public control.

This latest book concentrates on issues other than land use and resource conservation. Three other RFF books, previously reviewed in *Soil Conservation*, treat the subject of conservation in more depth: *Land for the Future* (January 1961), *Soil Conservation in Perspective* (January 1966), and *Governing Soil Conservation—Thirty Years of the New Decentralization* (June 1966).

Part I deals in depth with rural living conditions, rural social services, the reaction of farmers and rural townspeople to their living conditions, what is happening to small towns and to the pattern of agricultural settlement, and the land use situation in general.

Part II describes farming as a business. It deals with numbers of farms, farm labor, demand and supply, foreign trade, farm income, and use of capital.

Part III, "A Look Ahead to the Year 2000," sets out, in very broad terms, some of the possibilities for agriculture a generation hence.

The final two chapters note some of the problems facing agriculture in the future.

The Department of Agriculture, of course, has been engaged in a

major effort on several fronts to project its role in *Agriculture/2000*. This book should be of interest and value to all those engaged in this effort.—NORMAN A. BERG, *deputy administrator for field services, SCS.*

Water Quality Criteria. 1968. *U. S. Dept. Int., Federal Water Pollution Control Administration.* 334 pp. \$3.

The report of the National Technical Advisory Committee to the Secretary of the Interior is the most comprehensive document on water-quality requirements to date. It illuminates the fact that the unknowns still far exceed the knowns in water-quality requirements—even for the experts. One of the most valuable aspects of the report is the examination of research needs and the guidance offered in such needs.

Section IV devotes 73 pages, or about a third of the total text, to the discussion of agricultural uses. Key criteria are presented for water supplies for farmsteads, livestock, and irrigation. Salt and salt tolerance of plants are given due consideration. This section cites 200 references relating to the quality of agricultural water.

Similarly detailed consideration is given to water-quality standards for recreation and esthetics; public water supplies; fish, other aquatic life, and wildlife; and industry.—H. C. ENDERLIN, *Engineering Division, SCS, Washington, D. C.*

Engineering Quality of Water Management. BY P. H. McCATHEY. 1968. *McGraw-Hill Book Co., New York.* 295 pp., illus. \$12.50.

This book lays the groundwork for an understanding of the management and treatment of water for control of its quality. The problems of water quality that are generated as man puts water to beneficial uses are clearly defined.

This book takes a systems approach to the entire water regime by considering streams, lakes, ground-water bodies, and estuaries

as a common pool from which withdrawal and other uses are made and into which wastes are received. In this system, quality factors are interchanged between water resource and user, and connections are identified where engineering practices may be used to alter water quality.

The magnitude of the task of water-quality control in the United States is estimated, and the rationale and criteria underlying man's attempt to exercise control are explained. The reader is given a basis for judging the relationship between national objectives for water quality and technological ability to achieve them under current concepts of economics.

Of particular interest to soil conservationists is the discussion of the use of soil and pond systems for water-quality improvement.

The seriousness and complexity of this important thesis are relieved by a light hearted style and epigrammatic wit.—H. C. ENDERLIN, *Engineering Division, SCS, Washington, D. C.*

Rural Poverty in the United States. 1968. *The President's National Advisory Commission on Rural Poverty. (Superintendent of Documents) Washington, D. C.* 601 pp. \$5.95.

This book contains the papers prepared by individual social scientists and economists that provided background information for the commission in arriving at the recommendations submitted to the President in the report, *The People Left Behind* (reviewed in *Soil Conservation*, May 1968).

Only the dedicated specialist is likely to labor through the difficult professional prose to get at the facts and opinions in the 31 chapters. The book is being made available to County Technical Action Panels through distribution by the Extension Service to its field supervisors and by Farmers Home Administration to its district supervisors.—HERSCHEL E. HECKER, *assistant to associate administrator, SCS.*

New publications

Natural Resources of Pennsylvania. 1968. U. S. Dept. Int. 53 pp., illus. \$0.65. Another in the Department of the Interior's series of booklets describing the natural resources of the states, the one on Pennsylvania recognizes agriculture as ranking with mining and manufacturing among the state's chief industries, with iron and steel leading the list. The commonwealth is especially rich in "recreational resources," and recreation and tourism together constitute its second largest industry.

Twelve federal natural resources agencies have programs in Pennsylvania. The booklet briefly describes each and tells where to get additional information about its activities. SCS assists in the development and conservation of soil and water resources.

Water Intake on Midcontinental Rangelands as Influenced by Soil and Plant Cover. BY FRANK RAUZI, C. L. FLY, AND E. J. DYKSTERHUIS. 1968. USDA Tech. Bull. 1390. 58 pp., illus. \$0.25. A bulletin published by the Agricultural Research Service and the Soil Conservation Service in cooperation with the Wyoming Agricultural Experiment Station reporting on water-intake studies conducted with a mobile raindrop applicator on rangeland sites in six states in the Northern and Central Plains. Results of 670 tests on nine range-soil-groups located throughout a wide range of precipitation zones and latitudes were evaluated. Statistical analyses of the data included simple and multiple stepwise regressions. Equations were developed for estimating water-intake rates for each range-soil-group.

Evapotranspiration and the Water Budget of Prairie Potholes in North Dakota. BY JELMER B. SHJEFFLO. 1968. U. S. Dept. Int., Geol. Surv. Prof. Paper 585-B. 49 pp., illus. \$0.45. Report of a study of the hydrologic behavior of 10 potholes 1960-64. The average evapotranspiration during the May to October period each year was 2.11 feet, and the average seepage 0.60 foot. The greatest source of water was direct rainfall on the pond surface, 1.21 feet per year. Spring snowmelt supplied 0.79 foot of water, and runoff from the land surface during the summer 0.53 foot.

Estimating Evapotranspiration in a Humid Region. BY SEPPO E. MUSTONEN AND J. L. MCGUINNESS. 1968. USDA Tech. Bull. 1389. 123 pp., illus. \$0.50. The basic purpose of the study was to obtain a procedure for estimating watershed evapotranspiration (ET_w). The ET_w models were derived on the basis of data obtained from large weighing lysimeters for which moisture storage data were available. The models were then applied on natural watersheds in order to check the appropriateness of

the models and to derive coefficients for use in watershed studies.

Water Data for Metropolitan Areas. COMPILED BY WILLIAM J. SCHNEIDER. 1968. U. S. Dept. Int., Geol. Surv. Water-Supply Paper 1871. 397 pp. \$1.50. A summary of data from 222 areas in the United States. Information for each area consists of data on size and population, a short statement of the hydrology of the area, a summary of current data-collection activities in the area, a listing of current USGS investigational projects in the area, and a short listing of reports relating to the hydrology of the area.

Methods of Measuring Water Levels in Deep Wells. BY M. S. GARBER AND F. C. KOOPMAN. 1967. U. S. Dept. Int., Techniques of Water-Resource Investigations of the U. S. Geological Survey, Book 8, Chapter A1. 23 pp., illus. \$0.20. Accurate measurement of water levels deeper than 1,000 feet in wells requires specialized equipment. This report on testing of special equipment was prepared on behalf of the U. S. Atomic Energy Commission.

General Procedure for Gaging Streams. BY R. W. CARTER AND JACOB DAVIDIAN. 1968. U. S. Dept. Int., Techniques of Water-Resource Investigations of the U. S. Geological Survey, Book 3, Chapter A6. 13 pp., illus. \$0.20. Describes the objectives and procedures used in obtaining

streamflow records. It is an introduction to other chapters on surface-water techniques which treat individual procedures in greater detail.

Soil and Water Conservation is Everybody's Business. (1967). International Harvester Co., Chicago. 23 pp., illus. An attractive new public relations booklet, to be distributed mainly through the company's dealers and outlets, effectively tells the conservation story as it is being unfolded in soil and water conservation districts with SCS help.

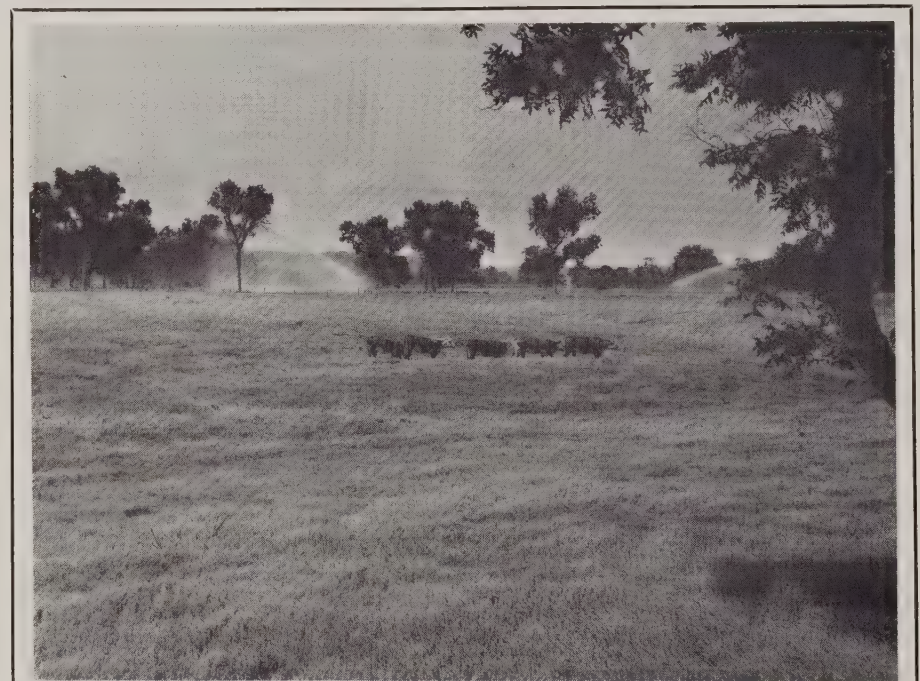
Geology of the Great Smoky Mountains National Park, Tennessee and North Carolina. BY PHILIP B. KING, ROBERT B. NEUMAN, AND JARVIS B. HADLEY. 1968. U. S. Dept. of Int., Geol. Surv. Prof. Paper 587. 23 pp., illus, map in pocket. Summary of the results of a long investigation of the rocks of the Great Smoky Mountains (1946-55).

1968 Annual Technical Conference Proceedings. Sprinkler Irrigation Association. 1968. The Association, Washington, D. C. 110 pp. \$3.00. Contains 13 professional papers by specialists in seven western states.

Soil Surveys

Glenn County, California. BY E. L. BEGG. 1968. 198 pp., illus; maps 3.17 inches to the mile (1:20,000). Fieldwork by E. L. Begg, G. F. Hafer, and R. E. Nelson.

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



America The Beautiful—Oklahoma

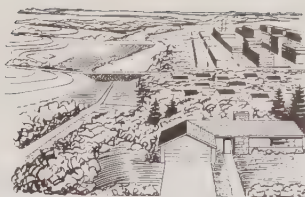
USDA SOIL CONSERVATION SERVICE

IRRIGATED COASTAL BERMUDAGRASS REPLACES BRUSH, ARBUCKLE SOIL AND WATER CONSERVATION DISTRICT

Full-color lithograph prints suitable for framing—one for each state, Puerto Rico, and Virgin Islands—are available from the Superintendent of Documents for \$0.10 each or \$5 for set of 52. Obtain order blanks from your local SCS or post office.

From the Administrator:

Pollution and the Total Environment



There is growing concern among people everywhere about the environment in which we live. Pollution, in the form of dirty water, foul air, and contaminated soil, is a major contributor to the unwholesomeness of our environment. Litter and waste strewn about the landscape are a closely related problem.

Public opinion about the kind of life Americans should be privileged to live demands that pollution be substantially abated as one means of enhancing the environment.

We who are charged with the responsibility for conservation and wise use of natural resources can contribute to satisfying that demand. All professional conservationists must share in that contribution.

Pollutants, once in the air, in surface watercourses, or in underground aquifers, are difficult to control. The contamination spreads from urban to rural areas, and vice versa. Pollution no longer is confined to areas of dense population. A large processing or manufacturing plant far removed from any large city, for example, may be a source of heavy pollution. So may a large modern feedlot operation, regardless of where located.

The extensive use of chemicals in modern farming and forestry contributes to the problem. Small towns, farm homes, and other rural establishments without adequate sewage facilities often add to the pollution load of streams miles away.

Sediment from farm and ranch land, roadsides and streambanks, surface-mined areas, suburban housing developments, construction sites for industrial plants and public institutions, and many other

disturbed or intensively used areas diminishes the utility and esthetic quality of streams, lakes, ponds, and estuaries.

In speaking on agriculture and pollution before the Chamber of Commerce of the United States earlier this year, the Secretary of Agriculture said, "Agriculture is both sinner—and sinned against—in this matter. Last year, crop damage from air pollution alone was nearly half billion dollars. And farmers—like everyone else—need clean water to drink, clean air to breathe and, of course, unpolluted air and water for their crops and livestock."

He then outlined four major areas of concern in which the Department programs are being designed to alleviate pollution.

They are:

(1) Reduced use of persistent pesticides and the continual search for additional safe and effective biological, ecological, or cultural control of pests;

(2) Stepped up research to find effective ways of disposing of animal manures, agricultural processing wastes, and crop and forest residues;

(3) The prevention or reduction of silt and sediment; and

(4) More judicious use of irrigation water so as to reduce saline pollution.

In addition, the Department has studied and prepared guidelines for disposal of trash and other castoff materials from rural and small town areas.

Many soil conservation districts have taken the leadership in pollution abatement programs. More should do so. Soil Conservation Service employees everywhere must be alert to pollution problems and

provide the necessary assistance to individual landowners, communities, and county and multicounty authorities in preparing local programs and plans for reducing air, water, and soil pollution.

Practices that will reduce sedimentation and other pollution loads include all erosion-control measures and especially those for stabilization of roadsides, streambanks, strip-mine spoil, and other critical areas; lagooning to dispose of sewage effluent and livestock wastes; safer uses of pesticide and fertilizer chemicals; modernization of irrigation systems to permit optimum use of water; the use of spray irrigation systems to dispose of certain effluents on adapted soils, and selection of sites for effective disposal of solid wastes.

Wherever the need arises—and this is almost everywhere—the conservation job is incomplete until every practicable means of pollution abatement has been established. In the end, of course, this will be done only if it is the *will* of the people to effectuate the necessary practices. The governing bodies of soil and water conservation districts and other community leaders, armed with the necessary facts which the resource agencies and educational institutions can bring together and properly interpret, can go a long way toward creating that will.

Working hand-in-hand with land owners and users in soil and water conservation districts and sharing our technical knowhow with a concerned public, the Soil Conservation Service can play a major role in helping to make a better America. This, however, makes it all the more important that we keep our technology on soils, water, plants, and engineering strictly up-to-date. We cannot use yesterday's technology for today's job unless it is still sound, efficient, and economical. As we move toward the decade of the 70's, that is our challenge as a technical organization.

D. A. WILLIAMS



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Colorado wheat growers rely on stripcropping to protect fields

Another field of dry cropland on the Epple Ranch near Roggen, Colo., was established in an improved stripcropping pattern in 1968 because land not adequately protected in 1967 suffered from wind erosion.

John E. and Russell C. Epple, owners of the ranch, plan to add still more to their stripcropped acreage next year.

About the only land that did not blow in the spring of 1967 was the fields that had strips 10 rods wide and running north and south, crosswise to the prevailing winds, John said. Land with strips 20 rods wide, in a diagonal direction, had to be plowed to control erosion.

Stripcropping is not new with the Epples. They installed their first strips in 1956 as cooperators with the Southeast Weld Soil Conservation District. They have some 3,600 acres of cropland and expect eventually to have much of it in a stripcropping system.

John G. Epple, grandfather of the two brothers, settled on the ranch in 1885 and homesteaded on part of it in 1903. John Russell, and their late father, John H., were all born and raised in the same house on the ranch.

The Epples have a good stubble-mulch program along with the strips to provide additional protection from the wind. Their tillage

equipment consists of "crust-busters," Miller bars, stubble rods, Noble plows, and Graham-Hoeme plows, among others. These are used in multiple hitch arrangements successfully.

When following the strips after harvest, the Epples use a Noble plow to control weeds in a 6-foot wide area on each side of the strips. This conserves moisture for the planted wheat next to the edges and keeps the grasshoppers out of the new wheat.

Russell Epple is the president of the board of supervisors of the Southeast Weld District.—WILLIAM KIPPER, *work unit conservationist, SCS, Keenesburg, Colo.* ♦

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SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: Fishermen and campers swarmed to the Tribble Fork Dam in the American Fork-Dry Creek Watershed Project in Utah on opening day of fishing season at the multipurpose reservoir.

Payoff . . .

Conservation is no exception to the truism that "results count."

No amount of altruism and wishful thinking will substitute for visible returns in motivating land-owners and community leaders to practice conservation.

Happily, the payoff is evident in every operating conservation district and watershed or RC&D project, as the examples reported in this issue of *Soil Conservation* show.

Self-starting: Word of notable industrial development in a remote rural area of southwestern Oklahoma led us to send SCS writer Walter Allen to see what was happening. His account (p. 99) makes clear that economic growth needn't wait on outside stimulus. Local leaders who saw the potentials of local resources and told the story to industrial management brought a needed balance to a rural economy.

TAP: Similar enthusiasm generated by the Technical Action Panel in a Michigan community gives cause for the optimism reported by SCSer Martin Kangas (p. 101). In this case, a regional framework plan developed by district leaders helped identify local resources for attention.

RC&D: More formalized programs in resource conservation and development projects give added drive to measures that bolster local economy. ERS Economist Dwight Gadsby, at our request, explains how the multiple benefits of these projects are evaluated (p. 105).

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ORVILLE L. FREEMAN, Secretary of Agriculture

JOHN A. BAKER, Assistant Secretary of Agriculture

DONALD A. WILLIAMS, Administrator, Soil Conservation Service

BEN O. OSBORN, Editor

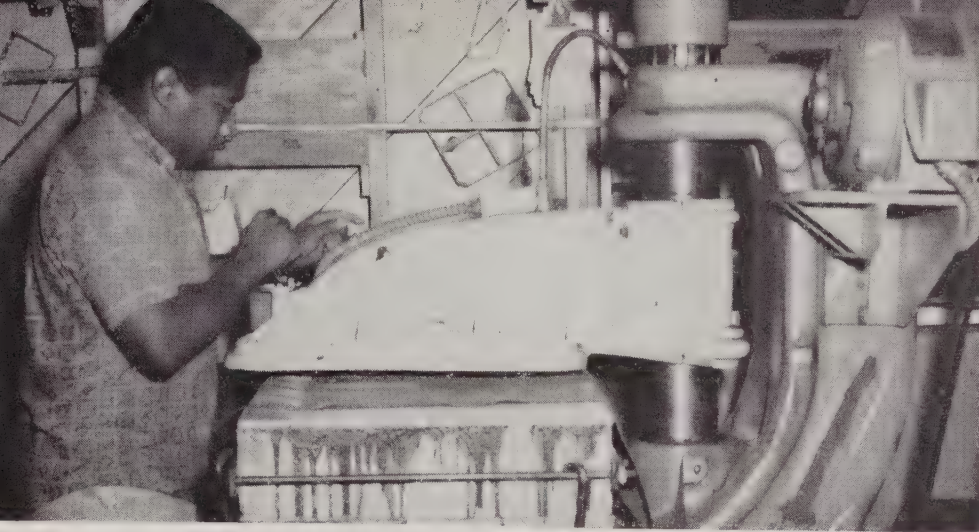
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Industry: Take notice!

Oklahoma community uses quality labor and space to balance farm economy

A wheat-and-cotton community in southwestern Oklahoma has done what hundreds of other communities in America are talking about.

It has taken a lot of the ups-and-downs out of its economy.

No longer is there a steady outflow of people.

Small farmers are no longer selling out, either to big farmers or to other small farmers who found themselves with holdings too small for a living from farming alone.

A new order

And downtown the merchants report a new order of business, a stability unknown before.

The area—Tillman County, with Frederick its seat of government—has attracted industry to the point that everybody in the county who wants to work in one of the plants is working there.

Some workers are even commuting from surrounding counties.

And Paul McLellan, the man the local residents say is mainly responsible, says that if any new industries want to come to Frederick people will have to move into the county to work in them. That means growth, and Frederick's Chamber of Commerce, which from the beginning has given strong leadership to the upward push, is preparing for it.

Agriculture, of course, is still

Tillman County's leading industry. The county is fifth in land in agriculture in the state. Wheat is its leading cash crop, with cotton second. Grain sorghums and alfalfa are becoming more important. The county leads in Oklahoma in the output of alfalfa seed. Interest in livestock—there are about 60,000 head of cattle, mostly beef, aside from those in feedlots—is growing.

Most of the county's 1,001 farmers are working on or have completed conservation farm plans. Woodrow Bohannon, chairman of the Tillman County Soil and Water Conservation District, estimates that conservation work done by the landowners is contributing \$500,000 a year to the local economy.

Quality of labor

In the seven small industrial firms in Frederick there are 700 employees. Well over 600 of the employees are from farms. In many cases the farm wife, too, is employed in one of the plants.

The quality of labor was one of the factors attractive to the operators of the industrial plants in considering the area. The employees learn quickly the needed skills and are glad to have the chance at income which will mean they can keep their homes.

Space was another factor. Fred-

erick had established an industrial park with ample room for expansion of facilities.

Access to markets was a third. Two railroads and a modern highway system serve the area.

The community began the effort to bring balance into its economy as long as 15 years ago.

"We knew we had to attract industry," explained McLellan, a Frederick resident from early childhood. "We decided first to find out what it would take to get it here."

A first step was a request by the Frederick Chamber of Commerce to the Agricultural-Industrial Service of Oklahoma State University at Stillwater for an area survey. The survey showed a top-heavy cash crop income with a low percentage from livestock. It also showed a need to improve school facilities and to provide for additional cultural and recreational advantages.

Frederick leaders promptly formed Frederick, Inc., an industrial foundation and set about to meet the conditions outlined in the survey. McLellan directs the foundation's affairs.

Soon industry started to take notice.

The second largest industrial employer to set up a plant in the new industrial park is a leather goods manufacturer. The firm employs 225 men and women at the local



Billfolds (right) produced at the leather goods firm may carry some of the new dollars in Tillman County's economy. New irrigation systems (left) like the one Ernest Hazel is discussing with Jack Bohl of SCS help keep agriculture strong.

plant and at a subsidiary in Tipton, a neighboring community in the county. The company has expanded twice and soon will add space for 50 additional workers.

Another company, manufacturing women's garments, started 5 years ago with 10,000 square feet of space and 25 workers. It has expanded four times and now has more than 135,000 square feet with 350 operators. It has an international market.

The newest arrival on the industrial scene is a firm which specializes in overhauling jet aircraft engines. It employs 90 workers now, and officials expect to increase the number to 250.

A stone-working firm employs 66 workers and uses 6,000 square feet of space. Its products are in national demand. Company heads say plans call for the production of structural stone soon.

A new garment factory has entered the field with 30 workers employed in an almost completely automated plant.

Two of the local industries are associated with agriculture. There are four feedlots with a total capacity of 18,000 head. One of the firms, on the highway east from Frederick, is the second-largest in Oklahoma and is still expanding. It now has a capacity of 15,000.

A new fertilizer and agricultural chemical firm operates a bulk fertilizer blending plant and ammonia storage and handling facilities.

The feedlots consume more feed than is raised in the county. The practice of soil and water conservation has encouraged the shift to pasture, forage production, and livestock as a more efficient use of the land resource. Irrigation from wells, with farmers using the technical skills of the Soil Con-

servation Service to develop conservation systems and do other conservation work, is claiming increasing interest.

Laxton Malcolm, Tillman County's extension agent, says the average size of farms in the county has been growing over the years, reflecting the national trend. However, the rate of increase is considerably less now that landowners have access to additional income from industry. The average size of farms now is 500 acres. In 1945 the 2,081 farms averaged about 240 acres.

The movement of labor from the farms to the industrial plants has worked a degree of hardship on some of the farmers. However, the use of larger equipment has helped to solve the problem.

"What we have done hasn't all been roses," Bohannon, the soil conservation district board chairman, said. "But we have worked together. I don't know of any town our size that has moved ahead with such energy to attract industry. We are happy with our progress.

"The advantages of having industry here to balance our agricultural income far outweigh the disadvantages. Industry shares the tax load and as a result we have better schools, highways, and public facilities. I think we will find it has meant faster progress with our resource conservation work, too. ♦

It's construction time again as a garment factory expands for the fourth time since it started in Tillman County 5 years ago.



A town of tomorrow—today

By Martin E. Kangas

Work unit conservationist, SCS, Ontonagon, Mich.



“Ewen is where the lucky ones live all year around.”

You hear it said often today around this small Ontonagon County town in Michigan’s Upper Peninsula.

But it wasn’t always so. Young men once grew up saying, “Ewen is a good place to be from.” They couldn’t wait to leave for the cities of southern Michigan, Wisconsin, and Illinois.

Yes, Ewen has changed. But no miracle occurred to make it so. No one struck gold. No new industry moved in to solve Ewen’s economic problems. No generous benefactor came in to help the community. Only unlimited enthusiasm, progressive planning, hard work, and an optimistic attitude among its people are making Ewen what it is today—a better

place to live. Members of the Ontonagon-Gogebic Technical Action Panel are giving a helping hand.

With a population of less than 500, Ewen has taken to rural areas development seriously. Its leaders want Ewen to be one of the new type of community needed in rural America—The Community of Tomorrow.

“We know we need a broad base in our development,” said Gerald Hendrickson, president of the Ewen Businessmen’s Association. “We need the combined resources of the entire area to make Ewen truly a Community of Tomorrow, not just a nice looking town in a rundown countryside.”

Ewen, like most other rural towns, is dependent on the surrounding area for its existence. It needs its agriculture, its forest in-

Signs that Ewen is on the move: A market becomes “super” in a new building (below, left to right); and town, school, and church join to build a combination play area and parking lot (above).





This school playground, leveled and drained as a community project, doubles as a skating rink in winter.

dustries, its mining, and its recreation. Ewen's progressive leaders see the wisdom in a broad area approach to community development.

A framework program for the Copper Country Broad Program Area, developed jointly under the leadership of directors of the Ontonagon, Houghton-Keweenaw, and Baraga soil conservation districts (see *Soil Conservation*, January 1967), has been the guide and inspiration for villages and communities to plan resource developments.

"It has directed our efforts to build a community where our young people can be properly edu-

cated and trained for good jobs," said Joseph Strnad, township supervisor and chairman of the Ontonagon District. "For example, the framework program indicated that we can economically support an overnight trailer and camping ground. One is being developed. It further indicated that we must upgrade our buildings and improve public facilities if we expect to attract the young miners working the White Pine Copper Mine 30 miles away.

"A major beautification and home improvement program was begun last summer. Natural gas was made available, all major streets resurfaced, and new mercury lighting installed throughout the town. Dozens of lots were im-

proved, buildings remodeled and repainted, and engineers were hired to develop a new sewer and water system.

"The program showed us the need for medical and dental facilities. Plans are underway to build a clinic in Ewen. The land has been acquired and prepared for building. Financing is being arranged.

"We were also told that the surrounding area can support an additional 1,400 head of beef cattle. New farmers are buying farms, and established ones are increasing their herds. Improved market facilities are being planned," Strnad concluded.

Many other improvements are in progress or are nearing completion. Among these are better telephone service, street and sidewalk improvements, a new roadside park, a playground and skating rink. Farm home improvements, rural beautification, veterinary service, farm-based recreation, fee fishing, hunting, and fishing and canoeing guide service are all part of the package.

Local USDA agencies, through TAP and its "outreach" activities,

The old variety store becomes a modern, attractive place to shop and a mark of confidence in Ewen's future.



are taking an active role in helping Ewen build its community of tomorrow. Advice and financial help have also come from other agencies and groups.

The Soil Conservation Service has given guidance to the Ewen Businessmen's Association and other local organizations in resource development. It has provided help in resource planning and application. It has given on-the-site technical assistance on soils, water management, vegetation, biology, and land use.

The Cooperative Extension Service has helped initiate rural beautification, cleanup campaigns, development of market facilities, and information programs.

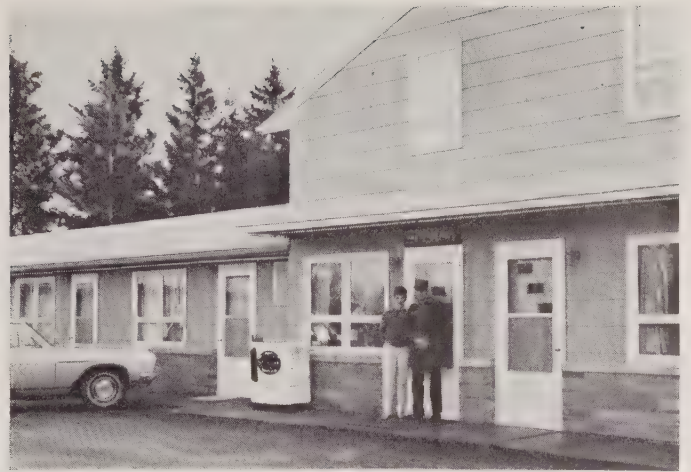
Farmers Home Administration has provided financing for rural home and farm improvements. Small Business Administration has provided financing for business improvements.

Agricultural Stabilization and Conservation Service has shared costs of projects that will help small farmers increase their incomes.

Ontonagon district directors have worked enthusiastically in the community, encouraging and assisting in planned developments that enhance rural life and increase rural income.

Ewen is already seeing results of its efforts. Jerald Strnad, a young man who grew up in the community, came back from the big city to build and operate a motel. He is one of 12 young men to return to Ewen recently. Other former residents, like Gene Potter, came back to Ewen's friendly and peaceful environment to retire.

William Malnar and William Johnson are building an 8,700-square foot variety store. James



Jerald and Ann Strnad came back to the "new" Ewen and operate this new motel.

Flemming is putting the finishing touches on a new home. His is one of over a dozen new homes in the Ewen area.

Two adjoining school districts have been annexed to the Ewen district. The neighboring towns of Bruce Crossing and Bergland are also building, remodeling, and upgrading their service facilities.

"We expect Ewen to become a community where we can get medical and dental care, where our old

folks can have a decent home for their retirement years, and where we can all enjoy the beauty and recreation potential of the north country," says Joe Strnad.

The enthusiasm and initiative generated in Ewen can be felt throughout the entire area. Everybody is optimistic about the future. They aren't waiting for the year 2000 to have their Community of Tomorrow. They are working on it today. ♦



Main Street will take on a new look, too, as Ewen moves toward tomorrow. New pavement and curbing are already in place.

Contractor adds ditch-lining business and multiplies RC&D project benefits

A New Mexico contractor has turned a conservation need into new jobs for seven people and dollars for the whole community.

I. M. Roybal of Pojoaque, N. Mex., 3 years ago expanded his house-building business to include concrete ditch lining for irrigation and invested \$30,000 in extra equipment.

A factor in his decision was creation of the Northern Rio Grande Resource Conservation and Development Project. Local community leaders organized the project to focus technical and financial help from federal, state, and other sources on resource needs to turn the area's economic spiral upward.

Some of the assistance was channeled into improving irrigation systems.

The multiplier effect

Mr. Roybal expanded his contracting business and hired seven more men full-time to meet demands for new irrigation ditches. Seven families benefit from the employment, and Roybal buys more concrete in the community, more

fuel, and parts for his equipment. Thus, dollars produce dollars to multiply the economic uplift.

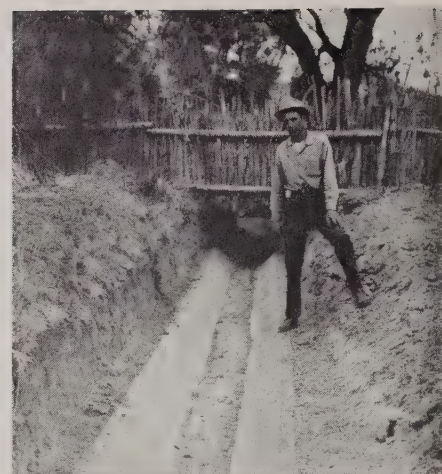
Roybal has added his own innovations to a hand-placed ditch-lining operation. He mixes his own concrete in the field in a $\frac{1}{6}$ -cubic yard mixer mounted on the back of a small tractor. The concrete is dumped from the mixer into the ditch and shaped with a hand-pulled screed. The screed is guided by wooden rails placed on each side of the ditch. With this method Roybal can line about 350 feet of ditch a day.

The value of saving water

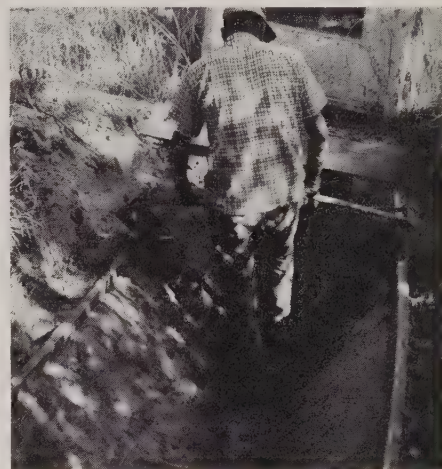
Roybal plans to further increase his operation later on with purchase of a slip-form ditch liner and increase his crew from seven to 11 men.

His customers often express their satisfaction with the efficiency of their new irrigation systems, for people in the traditionally water-short Pojoaque Valley know from experience the value of saving water.—BRUCE KIDMAN, *engineer, SCS, Santa Fe, N. Mex.* ♦

I. M. Roybal's tractor-mounted concrete mixer speeds service to his irrigation-ditch customers.



A hand-pulled slip-form (above) shapes the fresh concrete mix into a lining that eliminates seepage, saving irrigation water. Roybal (below) inspects the completed ditch.



Agencies join to save Puerto Rican parrot

The USDA's Forest Service and the Fish and Wildlife Service of the Department of the Interior have joined together to save the emerald green Puerto Rican parrot from extinction.

Less than 200 of the parrots remain alive and are found only in the 28,000-acre Caribbean National Forest in Puerto Rico.

The agencies will conduct an ecologic management investigation to determine the endangered bird's needs to recover its numbers.

They'll seek information on its reproductive processes, nesting habits, food requirements, natural enemies, and migration habits ♦

Resource conservation and development is the name. But the aim of RC&D projects is more. Their value lies not only in conservation action but also in ability to generate new and lasting jobs and income in an area. How to measure that ability? SCS and ERS are studying four of the first 10 RC&D projects and their impact on each area; some of the findings are shown in the table.

Adding up the benefits of RC&D

By Dwight M. Gadsby

Agricultural economist, Economic Research Service, Washington, D. C.

Specialists of the Soil Conservation Service and Economic Research Service are estimating the economic progress of selected Resource Conservation and Development projects in terms of increased gross income and new man-years of employment. This article describes how these economic evaluations are being made.

The goal is a complete inventory of all activated measures in an RC&D project involving both private and public expenditures. The evaluations rely heavily on economic data that are available for each measure. Estimates of private and public expenditures associated with project measures are made only when the actual figures are not available.

Evaluations are restricted to those benefits that can be estimated in dollars, although it is readily understood that there are other benefits. Community improvements such as clean water, freedom from congestion, and unpolluted air are important; but as yet no way has been found to quantify them, and

they must be classed as "intangible" benefits.

A question repeatedly arises regarding expenditures and activities that would or would not have taken place without the RC&D project. The test used is the question: What and how much economic activity is now being done that was not being done before the project was established?

The first step in an evaluation is to inventory and classify each project activity into one of six categories: accelerated services (soil surveys, for example), structural measures (Public Law 566 watershed projects), critical areas (gullies or seriously eroding land), land treatment (terracing), associated measures (a maple products study), and supporting measures (a private lake development). For convenience, each project measure is identified by a number, usually the measure's number contained in the RC&D project plan. The possible length of life of each measure is estimated. This is important in order to determine how measures

having different lifespans affect the economic life of the community.

Knowing the cost and duration of each project measure is extremely important, especially for those measures requiring an annual expenditure until completion. Estimated expenditures are grouped and totaled by short, intermediate, and longtime intervals. Community planners can then decide whether they are placing too many of their investments or expenditures in the present instead of the future, or vice versa. They can determine where bottlenecks and shortages will occur in their community development plans.

Determining the sources of funds used to finance RC&D project measures is not an easy task because the sources may be federal (RC&D or other), state, or local. Planners are interested in the ratio of public to private funds needed to encourage economic development. An important finding is that RC&D funds generally comprise a relatively small percentage of the total funds expended or invested.

It is important in this phase of evaluation that all possible expenditures and loans associated with the RC&D projects be identified and either estimated or actually measured. It also is important to differentiate between expenditures and loans that would have taken place without the project and new outlays that are stimulated by the project.

Estimated economic impacts of expenditures in the West-Central, Minn., Penn-Soil, Pa., Gwinnett County, Ga., and Upper Willamette, Oreg. RC&D projects

Project	Estimated expenditures Millions	Estimated gross income Millions	Man-years of employment				
			Construction	Technical	Annual	Other	Total
West Central	\$ 4.0	\$ 8.5	147	40	42	—	229
Upper Willamette	5.0	12.6	168	185	2	—	356
Penn-Soil	19.0	45.0	912	166	323	179	1,580
Gwinnett County	25.7	54.0	1,142	58	1,294	953	3,447

The next phase of the analysis is determining what proportions of the expenditures for each project measure are allocated to labor, machinery, materials, and other costs. Technicians and engineers who have firsthand experience in determining these types of costs are relied on to help with the estimates.

Another part of this analysis is estimating the "leakage" from the area—that part of the economic impact, either income or employment, that will accrue beyond the project area being studied.

For example, if a contractor building a Public Law 566 watershed structure comes from outside the area, it is reasonable to assume a significant amount of the income and employment effects of the measure's cost would be felt beyond the project area. Most of the workers hired to construct the measure would likely come from outside the project area. They could be expected to rent housing and purchase such things as food and gasoline within the area. But repair items, equipment, building materials, maintenance, and even fuel probably would be purchased outside the area.

These estimates should be made separately for each project area, although the relative proportions seem to show consistency between project areas. The techniques used lack precision, but they yield information that could not be derived in any other known fashion.

Employment, expressed in man-years, is one of the most significant portions of project evaluation. The new employment is directly related to new expenditures and classed into four types—technical, construction, annual maintenance and operation, and "all other."

Technical employment deals with the planning or layout necessary for setting up project measures. An example might be a surveying party laying out an earthmoving operation.

Construction employment is the

physical work needed to create the project. An example would be a bulldozer operator grading fill material for a watershed damsite.

Annual maintenance and operation employment is: (1) Labor involved in actual maintenance of a project measure, or (2) employment that evolves from the creation of a type of new employment. The latter employment involves a primary function rather than maintenance function. An example might be construction of a furniture factory in a forested area. The new employment would recur annually, just like maintenance; but it would create much more employment of a longer duration.

Annual maintenance and operations employment gives a sound measure of the durability of the employment created and raises the community's economic base to a higher level than existed before its creation.

Income effects are closely related to the expenditure patterns described earlier. Estimates of gross income are derived by applying selected multipliers associated with similar areas. While this procedure produces useful estimates of gross income, care must be taken to avoid hazards. Application of these multipliers is conditioned by many factors, and the results must be interpreted with these limitations in mind.

Economic improvement is fairly sizable for the project areas evaluated. The more urbanized and industrialized a project area is, the greater the gains should be in income and employment per dollar invested. It costs less to add to an already existing environment than to construct a new one; therefore it should cost less to create a new man-year of employment in a suburban area than in a completely rural area. But the net contribution of the new man-year to the general well-being might be higher in a rural than in a suburban area.

The field evaluations reveal several unresolved issues:

- How to quantify some of the economic benefits in a project area.
- How to more precisely measure RC&D effects.
- How to find more reliable local multipliers.
- How to identify economic responsiveness to different types of investments.

These issues raise questions about the effects of commuting patterns, capital flows, and underemployment. More precise answers need to be derived as to amounts of local capital in the form of savings that will be invested in new development as a result of federal and state spending. Also needed is a more precise way to distinguish between one-shot employment effects and permanent effects.

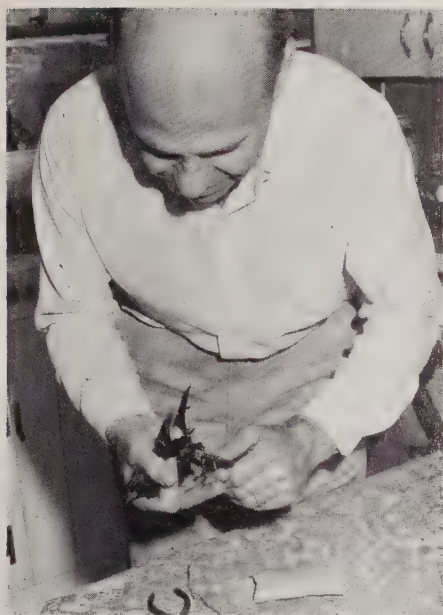
Answers to these questions can increase the accuracy of RC&D project area evaluations. ♦

Bird banding helps in teaching conservation

The Litchfield County Soil and Water Conservation District works closely with the White Memorial Foundation on many projects on its 4,000-acre wildlife sanctuary and nature center in the towns of Litchfield and Morris, Conn.

George Sweeney, SCS work unit conservationist, found one of its more unusual conservation activities to be maintaining a bird banding station conducted by the foundation's ornithologist, Gordon Loery.

Mr. Loery pointed out that it is a small station where about 1,500 birds were banded last year. Band-



Gordin Loery applies a numbered band to the bird's leg.

ing is a tool, not an end in itself, he said. Its importance is the recorded returns of birds that are retrieved by the bander or are recovered by another person who then reports the banded information to the U. S. Bureau of Sport Fisheries and Wildlife.

Locally, however, it has been of value as an arm of the educational activities of the foundation and its nature center in teaching several hundred students a year.

Habitat improvement practices suggested in the 4,000-acre soil and water conservation plan are designed to maintain bird traffic at high peak.—ALICE ROGERS, *Litchfield County Soil and Water Conservation District, Litchfield, Conn.* ♦

Land treatment basic to small watershed project

Land-treatment measures are basic to any watershed project. Structural measures cannot be fully effective unless these soil and water conservation measures are applied on individual farms and ranches, other rural land, and the public land of the watershed. ♦

Drop spillways stop 30-year gullies

Three concrete drop spillways solved a 30-year problem for Davis Green, dairyman of Albany, Ohio, and a cooperator with the Athens Soil and Water Conservation District.

Green's problem was gullies at three spots where 40-year-old tile lines led into culverts along a county road. After trying many remedies such as filling and sodding, rock walls, steel pipe extensions to the tile ends, and post-supported walls made of locust plants, Green consulted SCS Area Engineer Paul Hossler, who recommended the concrete drop spillways.

The spillways resemble three-sided boxes open at the front. The protected tile lines outlet into steel pipes which enter the box at the back.

This kind of concrete structure is good for trouble spots like Green's where tile and waterways

must outlet at the same place. It is also effective in situations where sod chutes aren't satisfactory. For instance, the structure may be used in places where grassed waterways outlet into streams or road ditches, at diversion or terrace outlets, or at places around buildings where it is desirable to step surface water down from one level to another.

Green and his wife, helped by their four boys and little girl, operate a 40-cow dairy farm. The land is fairly level and lends itself well to the modern equipment used. Conservation management of soil is visible over most of the 240 acres.

"I had tried for more than 30 years to stop these gullies. I once knocked the front end off a tricycle tractor by hitting a tile hole," Green said. Now he has found the answer.—RODNEY V. HAYDEN, *soil conservationist, SCS, West Union, Ohio.* ♦

Davis Green and son, with John Miller, SCS work unit conservationist, identify concrete structure at tile outlet that has eliminated the gullies so long plaguing the farm.



Bringing up crawfish

Field trials and research turn farm hitchhiker into commercial crop

By Olan W. Dillon, Jr.

Regional biologist, SCS, Fort Worth, Tex.

The crawfish gourmet concerned about the dwindling harvest of his favorite dish from rivers and swamps can take heart at field trials and research that are turning Louisiana crop fields into high-producing crawfish farms.

Levees built along major streams and canals that cut into lowlands and swamps have reduced the natural habitats of the commercially important swamp and White River crawfish.

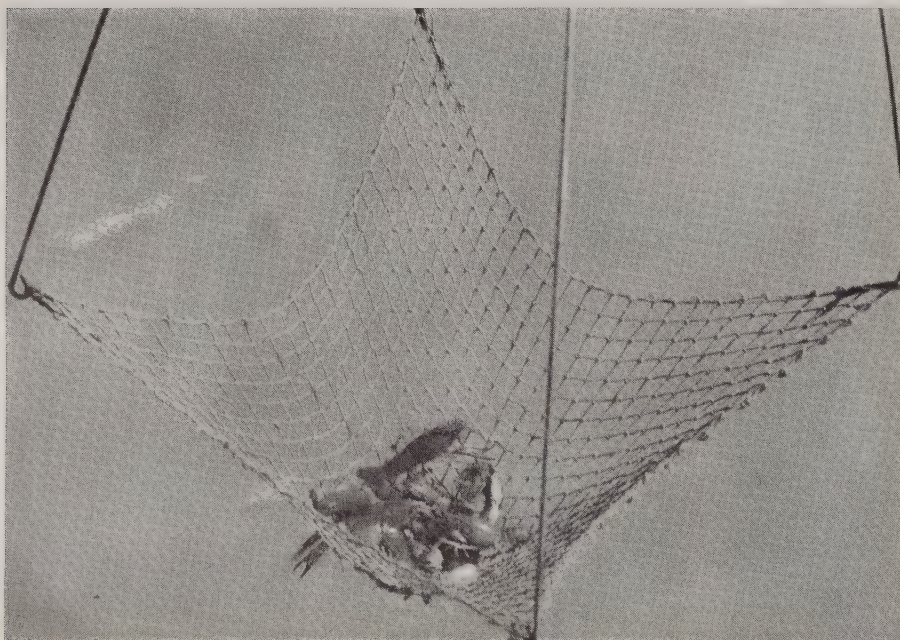
Both species grow rapidly, however, in farm fields where crops such as rice are irrigated and fertilized. The waterflow makes them feel at home. But production has varied greatly from year to year in both field and stream.

In the middle 1950's, farmers

who flooded fallow ricefields in the winter to control weeds and smooth the land often found a crop of crawfish in the spring. Not knowing why some fields produced crawfish and others did not, the landowners either gave the crawfish away or charged a small entrance fee to catch them.

Field trials

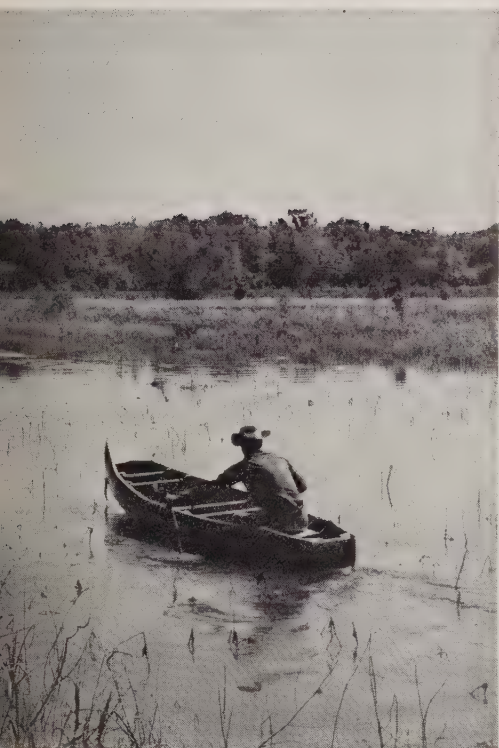
In 1960, SCS Biologist Carl Thomas tackled the production problem with a series of field trials near Crowley, La. Within a few years farmers were applying the farm production methods developed from these trials. Ten thousand acres were in crawfish fields in 1967, producing 6 million pounds of crawfish. Farmers have



Charlie Martin (above) checks the crawfish traps in this flooded field twice daily and harvests 40 to 70 pounds of crawfish a day. The crawfish (left) weigh about six to the pound.



A sign near Crowley, La. (above) directs customers to Bert Gilbert's plant where he processes his own and his neighbor's crawfish. Roland Faulk's daughter (left) shows the size of crawfish raised on their farm.



Cleaned crawfish chill in a cooler at John Rupert's processing plant near Eunice, La.



Pump at work flooding a 700-acre crawfish pond. The 1/2-inch wire netting keeps out small game fish.

put in additional 3,500 acres for the 1968 crop year.

The increased supply of crawfish, also called crayfish in some parts of the country, opened up new markets. Most public eating places in southern Louisiana started serving crawfish dishes during the spring crawfish season. Frozen food companies began to look at possibilities of marketing crawfish products all year. Previously, only a few specialty restaurants had prepared such gourmet crawfish dishes as etouffe, bisque, stew, potpie, and salads.

All was not well, however. With larger acreages of land in crawfish, problems developed. The field trials started by Thomas were not research, but they showed the way to dependable production and helped to define problems that needed further study.

Parallel problems

Parallel with production difficulties, problems developed in the processing industry. Because crawfish dishes had been mainly a home or specialty-restaurant product, mass-production methods were





Local workers at Rupert's plant process 1,200 pounds of crawfish a day or more. With a mechanical peeler they could greatly increase that figure.

lacking. Questions of proper storage temperatures (especially for fat which is important in the preparation of etouffe), possible byproducts, and many others remained unanswered.

Then the Louisiana Association of Soil and Water Conservation District Supervisors called a meeting of all research agencies in Louisiana to discuss research needs in this budding industry.

Coordinated research

As a result, Louisiana State University, the University of Southwestern Louisiana, and the Louisiana Wildlife and Fisheries Commission agreed to undertake the necessary research.

The Department of Food Science and Technology in LSU's school of agriculture is studying processing problems. The University of Southwestern Louisiana is doing research on biology of the crawfish. The Wildlife and Fisheries Commission is handling other parts of the research. The following studies are underway:

- (1) Analysis of crawfish catches.
- (2) Improvement of the storage quality of fresh peeled crawfish tails.
- (3) Development of marketable crawfish products.

(4) Determination of microorganisms in crawfish that may affect public health.

(5) Bacteriological examination of processed crawfish products from commercial plants and retail markets.

(6) Quality of crawfish from various sources.

(7) Analyses of present handling and processing procedures.

(8) Analyses of prices of crawfish and crawfish products.

(9) Recommendations for handling fresh crawfish and tail meats.

(10) Utilization studies of waste products, especially crawfish waste meal.

(11) Development of a mechanical crawfish peeler.

(12) Study of the practicability of packaging boiled, seasoned, whole crawfish.

With the widespread cooperation on these and other problems the producer, the processor, and the consumer can look forward to increased profits and pleasure from this new commercial agricultural crop. ♦

Terracing to shorten slopes

Slope lengths too long for erosion control by contouring alone can be shortened by terracing. ♦

Pump drainage picks up where tile leaves off

One farmer who refused to be limited by the lack of an outlet for a tile drainage system is Paul Niebel, a cooperater with the Henry Soil and Water Conservation District in Ohio. He installed pump drainage to overcome his high water-table problem.

The need for deeper tile outlets, increased availability of electricity, and power from gasoline engines have all made pump drainage attractive to many landowners in recent years.

Mr. Niebel's farm has less than 1 inch of fall per 100 feet over most of the area. The soil is Mermill fine sandy loam, a dark colored and very poorly drained type. It is highly productive, but tile drainage is required to control the high water table and remove other excess water.

The Soil Conservation Service designed the pump and the needed water-storage area as part of the conservation plan on the Niebel farm.—RUSSELL C. MILLS, *work unit conservationist, SCS, Napoleon, Ohio.* ♦

New conservation district next to New York City

Historic Yonkers and White Plains, N. Y., next door to New York City, now are in a soil and water conservation district.

The newly formed Westchester County Soil and Water Conservation District is an area that has undergone rapid urban growth in the last few decades. This urbanization has taken its toll in accelerated erosion, pollution, and resource waste.

The district's board of directors has developed a long-range program designed to preserve and restore the quality of the environment in the county. ♦

A 54-inch conduit running beneath the streets of Livingston, Tenn., has helped the town's residents sleep a lot easier on rainy nights.

Residents remember all too well the water-filled nightmare in 1962 before the flood-prevention measure was installed as part of the Hull-York Lakeland Resource Conservation and Development Project.

It was late in February. For 3 days the rains fell in torrents on the hills and valleys of the Upper Cumberland around the county-seat town.

At 3 a.m. on February 27 a call for help went out from the local shirt factory, employer of 1,400 people and the area's economic mainstay. Tons of floodwater was pouring into the factory and covering machinery, raw materials, and finished goods.

Volunteers rushed in and worked feverishly for 30 hours, moving equipment, supplies, and finished goods to upper floors and to other buildings as floodwaters continued to rise.

Radio Station WLIV, also in the path of the flood, could be reached only by boat. It rendered invaluable service to the community until forced off the air on February 28.

Keeping the shirts on our back . . .

RC&D help rescues a Tennessee town from loss of industry by floods

By Nathan I. Brown and Artice K. Booher

Assistant state conservationist, SCS, Nashville, and RC&D project coordinator, SCS, Cookeville, Tenn.

Many personal emergencies developed. Less Vann had to carry his wife from their flooded home. A teacher caught away from home had to borrow a boat to rescue his clothes before school. The postmaster's garage was flooded.

When the flood finally subsided, the community had suffered damage exceeding \$400,000, including \$68,000 in lost wages. The economic life of the entire area was threatened. There was talk that the factory would be closed unless the flood problem could be solved.

Search for a solution

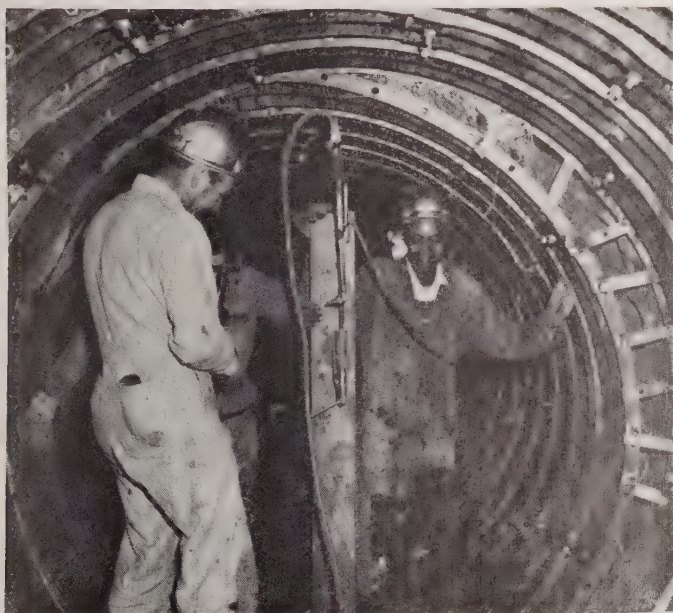
Overton County is typical Appalachian foothill country. Nestled close to the western edge of the Cumberland mountains, the area is rich in pioneer tradition, good neighborliness, and natural beauty but with limited opportunities. Ex-

cept for a few winding hard surfaced roads, the area is isolated. Out-migration has drained the area of much of its youth and talents.

Over the years many plans had been advanced and several attempts made to solve the flood problem to preserve what opportunities remained. Nothing worked. The job was too big, too complex, and too expensive for a small town's resources. Back in the mid-thirties, local leaders tried to get something done under the Works Projects Administration, but to no avail.

The flood area, boxed in by surrounding hills, is a victim of freak geography. Normal runoff water from 3,000 acres of farmland enters a sinkhole above town and passes safely and unseen beneath the city by way of underground caverns.

Workmen (left) install a liner for the conduit that will carry floodwaters 28 feet beneath a state highway. Without the conduit, the Livingston Shirt Factory (right) would be forced to leave town, taking 1,400 jobs with it.





Water stood in some of these homes more than a week after the 1962 flood.

But heavy runoff meets a restriction somewhere in the caverns, and floodwater backflows into an area occupied by the shirt factory, several small businesses, and a residential area. Frequent flooding had created an unsanitary 5-acre swamp within two blocks of the courthouse.

John Saddler, mayor at the time of the 1962 flood, said: "My telephone rang constantly. I was blamed for everything—the rain, the flooded factory, flooded streets, and even for the snow that fell on Wednesday night." Mayor Saddler called in pumping equipment from McMinnville and Lebanon, 65 and 75 miles away. This effort cost \$20,000 and had little effect. Another failing effort was to blast

away the restriction in the caverns, it was too deep underground to be found.

There have been several smaller floods since 1962 with the ever-present specter of another disaster that might permanently close the factory.

Success at last

When the Hull-York Lakeland RC&D Project was authorized in late 1966, the people of Livingston saw a new glimmer of hope, perhaps the last hope for solving a flood problem that had plagued them for a generation. They submitted their problem to the RC&D directors as a proposed project measure.

SCS engineers made a study. An

open ditch was ruled out because of its enormous size and depth and required location—right through the residential area. An alternative solution was to run about 1,100 feet of underground conduit some 28 feet beneath a city street and several vacant lots to an outlet into a nearby stream.

The project measure was approved and RC&D funds were used. The job was contracted for about \$118,000. The city furnished easements and rights-of-way and installed bridges and culverts, for about \$31,000. Work was begun in June 1967 and completed that fall.

Now, the swamp is rapidly drying out and no longer will mar the appearance and health of the adjoining residential area. The factory will stay and can expand as needed. Other commercial and industrial developments in the town can take place without fear of flooding. One new business has already been established in the low area. Others are planned.

Economists have calculated that the project will yield \$4 in benefits to each \$1 of cost. But in terms of job security, peace of mind, and freedom from a chronic sanitation problem, the people of Livingston believe the benefits incalculable. ♦

Room to grow

Rural America has adequate space for more people to live, work, and play; to perpetuate America's heritage; and to assure a strong community and family life with gainful employment and wholesome leisure. The enduring strength of our society may well depend on the future development and use of America's countryside. ♦

Ducks favor grassy shores

Ponds and marshes with bare shorelines are not high duck producers. Ducks shun a bare shore in favor of a grassed one except for daytime loafing. Trampling by cattle is the usual cause of bare, muddy shores although a drop in water level may have the same result. ♦

The local radio station relayed vital messages until 4 feet of water forced it off the air.



A truck farmer against the floods



Hezekiah Catchings (left) and SCS Conservationist Cecil Reeves examine farm plan.

What flood protection means to the truck farmer is contained in the knowledge that one flood can wipe him out.

A crop delayed 2 weeks may never pan out.

A field can be destroyed by overflow. If it is late in the season, the flood may mean total loss. If time permits replanting, there are double costs of labor, seed, and fertilizer.

A man who farms 80 acres can less afford to lose than the man who cultivates a thousand acres.

Such a man is Hezekiah Catchings, Crystal Springs, Miss., who farms in the Copiah Creek watershed. Each year he has had to replant a truck field capable of producing tomatoes that melt in your mouth and peppers that command top prices.

"One cabbage crop got ruined by sand that the high water carried in," said Mr. Catchings. "I lost about \$1,000 that year. Most years it's not that bad. I replant and

make a crop, but it costs me more."

Catchings, a cooperator with the Copiah County Soil Conservation District for 20 years, has battled the inroads of flood and fire without losing heart. Several years ago, when his house burned down, he rebuilt a nice home.

When he heard that the local soil conservation and drainage districts were sponsoring a watershed project to solve flooding problems, he organized 23 of his neighbors to petition in support of the project.

All the creeks in Copiah County draining into the Pearl River are included in this Public Law 566 project that extends over most of the eastern part of the county. The area contains some of the most fertile land in the state, on several hundred farms.

The Copiah Creek project is now being planned with SCS help.

Plans include establishment of grass cover, terraces, diversion ditches, and other measures to protect upland areas and prevent sedi-

ment rolling off into the streams and valleys. It was sediment damage several years ago that cost Catchings his cabbage crop.

Also included will be floodwater-retarding dams. Many farmers will take advantage of water supplies stored behind these dams to irrigate their crops and eliminate the hazards of truck-farming without sure water.

Hezekiah Catchings is one of these. "I'm thinking about irrigating my tomatoes and peppers from one of these reservoirs," he says.

Through the years he has renovated his upland pastures and established rotations, contour farming, cover cropping, and row arrangements to his valley land.

Catchings is a director of the Copiah County Forestry Field Day for Negro landowners, a deacon and officer in the Brushy Creek Baptist Church, and a secretary of the Baptist Men's Association, which includes members from eight churches. ♦

Many commercial farms earned higher incomes in 1967

Net farm incomes in 1967 were higher than in 1966 on 22 of 32 important types of commercial farms located in 20 major farming areas of the United States.

Those earning higher incomes included: Dairy farms in several parts of Wisconsin; broiler farms in Maine, the Delmarva peninsula, and Georgia; cotton farms in the Mississippi Delta, High Plains of Texas, and San Joaquin Valley, California; tobacco farms in the North Carolina Coastal Plain, Kentucky Bluegrass, and the Kentucky-Tennessee Pennyroyal area; spring wheat-corn-livestock farms in the Northern Plains; winter wheat-grain sorghum farms in the Southern Plains and winter-wheat-pea and winter wheat-fallow farms in the Pacific Northwest; cattle ranches in the Northern Plains and the Northern Rocky Mountains; sheep ranches in Utah and Nevada. ♦



Cattle seek the protected area, void of snow, behind an earthen windbreak.

Earthen windbreaks

give cattle a break on the open plains

By Donald J. Heyne

Work unit conservationist, SCS, Cheyenne, Wyo.

Manmade mounds of earth are being built on Wyoming's Laramie Plains as low-cost wind dampers that protect cattle during bad weather and help distribute livestock on the range.

About 200 of these embankments dot the plains around Laramie. Twelve of them serve as livestock

windbreaks for the Radical Ranch, 28 miles north of Laramie.

Do they work?

"You bet they do," says Pat Ryan, manager of the ranch and a cooperator with the Laramie River Soil and Water Conservation District. "The cattle use those shelters every night for a bedding

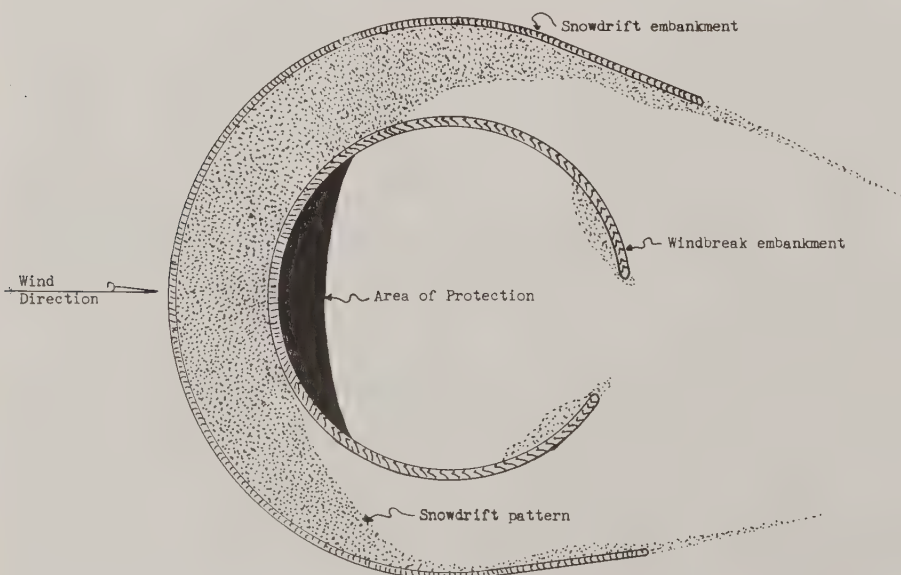
ground during the fall and winter months."

On the semiarid Laramie Plains natural barriers are few and poorly spaced, tree windbreaks are hard to establish, and slab or similar windbreaks are expensive. This prompted ranchers to build embankments of various shapes and forms, and, since the early 1950's, a general design has evolved.

The most popular design includes two earth embankments in a semicircle, three-quarters circle, or U-shaped arrangement. A large embankment 6 to 8 feet high provides protection for the livestock. A smaller embankment, about 3 feet high and 75 to 100 feet from the windward side of the larger embankment, is built to catch most of the drifting snow.

Low-cost construction

The earth windbreak is located on soils least susceptible to wind and water erosion and on topography which allows drainage of the area to be protected. The embankments are constructed with a bulldozer. The larger or windbreak embankment is constructed first. Earth is borrowed from the windward side, and the slope is made as steep as the soil permits. The earth for the smaller or snowdrift embankment is borrowed from the same area as the large embankment. This leaves a catchment basin for snow and rainfall. Aver-



This design for an earthen windbreak shows a large windbreak in the center, a smaller snowdrift embankment, and the borrow area and catchment basin between them. The wind velocity in the protected area may be reduced 50 percent as far as 20 to 30 feet inside the windbreak. A windbreak 400 feet long is large enough to provide protection.

age length of the earth embankments is about 500 feet.

The embankments built by contractors have been constructed on an hourly basis, and the cost of individual windbreaks has varied from \$70 to \$120. Costs of constructing a wood-slab windbreak on the Laramie Plains have averaged from \$700 plus yearly maintenance. The maintenance required on earth embankments is nil.

Finishing touches

Soil movement on the earth embankments has not been notably greater than in the undisturbed areas. In order to retard wind erosion, Ryan has seeded several of his earth embankments and borrow areas with western wheatgrass and reports a good stand. It is also possible to plant tree windbreaks in the borrow area if the soil is deep enough and the area protected from livestock.

Ralph Stahley, SCS work unit conservationist serving the Laramie Rivers District, says, "You ought to see cattle enjoying those earth windbreaks during blizzard conditions, while cattle without protection are all huddled up in the fence corners."

Pat Ryan says that by planning the location of earth windbreaks, ranchers can get better distribution of livestock on the range resulting in more efficient use of forage and more dollars in the pocket at selling time. ♦

Electricity at last

More than 2,500 people in Missouri, Montana, Oklahoma, and Texas will have electricity in their homes for the first time as the result of loans approved by the USDA Rural Electrification Administration.

Loan funds totaling \$4,416,000 will enable four REA borrowers to finance 295 miles of distribution line, 21 miles of transmission line, and eight new substations and to improve existing facilities. ♦

He sees the land and understands



Ross Strickland stands by a loblolly pine in a mixed stand where he is deadening the hardwoods.

If you haven't been enthusiastic about conservation and the benefits of a good forestry program, you should spend a day with Ross Strickland on his tree farm near Romance in White County, Ark.

Ross is retired from military service. He spends most of his time as a sales representative on Okinawa, 7,000 miles from White County. But if you visit with him awhile you know he spends a lot of time thinking about the half-million-plus trees that he has planted on 700 acres of badly

eroded cropland that formerly was used primarily for the production of cotton.

It is said that a conservationist is one who sees the land and understands what he sees. Ross began to see and to understand the need for land use changes in 1937 when he was planting trees for the Civilian Conservation Corps.

Ross pointed to a grove of pine and said, "This is the first 40 (acres) that I bought. That was in 1937. I paid \$300 for it by taking \$10 a month out of my \$45 CCC camp check." Down the road he pointed out the old Strickland farmstead where he grew up. It is now surrounded by a young stand of planted pine.

Ross set a fast pace as we toured the 700-acre tract. We crossed numerous old cropland fields all planted in pine varying from 2 to 13 years old. Every field is protected by a well-kept firelane. Occasionally, Ross called our attention to the scars of old gullies now healing under a mulch of pine needles.

Most of the open field tree planting is finished. Ross is now starting his timberstand improvement program on the hillsides that are covered mainly with cull hardwoods. The procedure he uses is to inject 2-4-D at the base of the cull trees.

No phase of conservation is overlooked on the Strickland tree farm. Ted Hall, forester with the State Forestry Service, is a frequent visitor. Ross also works closely with the White County Soil and Water Conservation District, Soil Conservation Service, and the Agricultural Stabilization and Conservation Service people.—THOMAS BURKETT, work unit conservationist, SCS, Searcy, Ark. ♦

What soil is

Soil is a storehouse of plant nutrients, a habitat for bacteria, an anchorage for plants, and a reservoir that holds the water needed for plant growth. ♦

Shooting preserve takes the pain out of duck hunting

Most of today's duck hunters face the problem of where to find quality shooting. Pete Lunsford of Eufaula, Ala., is providing sportsmen with one answer—a duck shooting preserve.

Pete owns and operates Pete's Mallard Ranch. He raises mallard ducks in captivity and offers them to hunters under conditions that test their shooting skill as sharply as the open marshes. The birds are trained to fly from a tower to a pond over the hunters concealed below.

The training starts when the ducks are 8 to 10 weeks old. Pete teaches them to walk downhill from the holding pen to the home pond, a distance of about 450 yards. At first the ducks are driven each day down an enclosed walkway to the pond.

Starting 2 weeks before shooting season, Pete makes his ducks fly that distance every day. He uses as a "flight tower," adjoining the holding pen, an inclined walk about 50 feet long rising to a height of 20 feet.

A few of Pete's ducks don't like to fly. Some merely jump from the tower to the ground; others fly only a short distance and alight. Since lazy flyers are not suited for hunting, but their table qualities are excellent, they promptly land in the freezer.

Elusive targets

The downhill area between the holding pen and the pond is wooded, creating a natural surrounding for shooting. As the ducks take off from the tower and fly zig-zag over the trees to the pond, they provide quality shooting. According to Pete, the average shooting preserve hunter fires seven or eight shots for each duck he kills.

Duck hunting on a shooting pre-

serve is especially attractive to the sportsman who doesn't like to crawl out of bed in the wee hours of a cold morning; drive to a far away place; then wait long hours in an uncomfortable blind for ducks that may or may not show up. On a shooting preserve, the hunter knows that ducks will be there.

Plans for hunting

Pete's shooting preserve didn't just happen. He gave it a great deal of thought and planning. He started with a conservation plan drawn up with help from the Soil Conservation Service. The pond was Pete's first consideration. Then, he designed his blinds to prevent lead shot from falling into the pond and causing lead poisoning of the ducks.

Pete also plans to provide hunting in the future for bobwhite quail, European wild hog, wild turkey, and whitetail deer. For deer and turkey, he is planting wheat, clovers, and ryegrass for green winter grazing. For bobwhite, he is planting such crops as bicolor and annual lespedeza in small, well-scattered plots throughout his shooting preserve.

Pete does not expect shooting preserves to take the place of other hunting. As far as he is concerned, natural hunting has no rivals. But he does believe that shooting preserves can and do provide quality shooting for sportsmen who have few opportunities for natural hunting.—SAMUEL H. GEIGER AND ROBERT E. WATERS, *soil conservationist and biologist, SCS, Gadsden and Auburn, Ala.* ♦

Wildlife in prairies

Prairie farmlands today support more kinds and greater numbers of birds, mammals, and fish than when the white man first saw them.

Hunters in the prairie States today find doves, deer, and squirrels in numbers seldom seen by early explorers. ♦

Meetings . . .

Manufacturers continue interest in conservation

The National Association of Manufacturers annual Congress of American Industries will be held in New York City on December 4-6.

The association has been concerned with principles of resource management for more than 20 years. Its Natural Resources Committee studies natural resource requirements of industry and recommends conservation and utilization policies that will assure a continuous supply of those resources.

NAM is one of the original sponsors of the National Watershed Congress. Its interest in watershed protection, forestry, soil and water conservation, and mining practices is substantial. *Our Native Land*, a basic handbook on wise use and management of natural resources, now in its third edition, has been one of the most popular educational booklets on conservation ever published.

Science researches food crisis and new frontiers

The Section on Agriculture will discuss "Research for the World Food Crisis" and "New Frontiers of Agricultural Research" during the annual meeting of the American Association for the Advancement of Science in Dallas, Tex., December 26-31.

A Committee on Science in the Promotion of Human Welfare and Scientists' Institute for Public Information will conduct a symposium on "Unanticipated Environmental Hazards Resulting from Technological Institutions." A Committee on Arid Lands is arranging a symposium on "Water Importation into Arid Lands." Twenty additional sections of the AAAS will hold meetings simultaneously.

Three major addresses on Fron-

tiers of Science as well as a panel discussion on Science Technology and Latin American Development will be presented during the general sessions.

Seed conference spotlights profits in forage crops

The Annual Farm Seed Conference scheduled for December 4, Dallas, Tex., will highlight the profitable uses farmers can make of soil conserving forage crops. The 1-day conference is sponsored by the American Seed Trade Association and immediately follows the annual meeting of the Southern Seedsmen's Association.

Some of the topics are "Concrete or Crop Land," "New and Profitable Forage Grasses," and "Profit Opportunities From Pasture and Range."

Dates and Places

December 1-7, American Association of State Highway Officials, Minneapolis, Minn.

1-14, American Farm Bureau Federation, Kansas City, Kans.

2-4, American Seed Trade Association, Farm Seed Conference, Dallas, Tex.

2-4, Newspaper Farm Editors of America, Denver, Colo.

2-4, Agricultural Relations Council, Chicago, Ill.

3-6, Western Forestry and Conservation Association, Seattle, Wash.

6-8, National Association of Manufacturers, New York, N. Y.

7-11, National League of Cities, New Orleans, La.

10-13, American Society of Agricultural Engineers, Chicago, Ill.

26-30, National Association of Biology Teachers, Dallas, Tex.

26-31, American Association for the Advancement of Science, Dallas, Tex.

January 1969

14-15, National Council of Farmer Cooperatives, Washington, D. C.

19-23, American National Cattlemen's Association, Honolulu, Hawaii

26-29, National Woolgrowers Association, San Francisco, Calif.

Outdoors—our heritage

A fundamental heritage of the American people has been the opportunity to know the outdoors—its character, its challenges, and its wonders. Traditionally, experience and activity in the open country have been an important part of the lives of most of our people.

Review



The Land Renewed. BY WILLIAM R. VAN DERSAL. 1968. Rev. ed. Henry Z. Walck, Inc., New York. 160 pp., illus. \$6.00

This enlarged and updated edition of a book first published in 1946 strikes squarely home to the need for a simple, forthright, balanced statement of the problems and opportunities in land resource use in modern America.

To the urban resident uneasy about such things as pollution, urban sprawl, and land deterioration, it will give a quick overview and historical perspective to the subject. It is a handsome, literate book that would be right at home on a highrise apartment coffee table.

It will be equally effective in the school room as a general introduction to the subject of natural resource conservation.

The new edition is thoroughly up-to-date with many new photographs among the 80 or more that face the reader from every right-hand page.

The book is dedicated to Edward H. Graham, "one of the world's great conservationists," who was coauthor of the original edition.—B.O.

Design of the Housing Site. BY ROBERT D. KATZ. (1966) 1967. *Small Homes Council—Building Research Council, Univ. of Ill., Urbana.* 233 pp., illus. 2d. printing. Single copy free.

Subtitled "A Critique of American Practice," this handsome and profusely illustrated album is the report of a study funded jointly by the Department of Housing and Urban Development and the Mobile Homes Manufacturers Association.

The stated goal of the report is threefold: "To identify factors, both technical and procedural, es-

sential to high-quality residential site planning; to document current practices throughout the United States; and, where appropriate, to recommend ways of improving site planning. The focus is on design and its relation to livability."

The result is a competent treatment organized under the principal headings of "Housing Types and Residential Density," "The Site," "The Plan—Private and Communal Aspects," "The Plan—Functional Aspects," "Innovations," and "Site Planning Regulations and Design Incentives."

The document will be useful to professional people and citizens concerned with land use planning and design in urban areas.—B.O.

New publications

Sanitary Landfill Facts. BY THOMAS J. SORG AND H. LANIER HICKMAN. 1968. *U.S. Dept. Health, Education, and Welfare, Public Health Service.* 26 pp., illus. \$0.35. The publication examines the planning, design, operation, and public health aspects of sanitary landfills and is offered as an aid to the growing number of people involved with planning and development in solid waste-disposal management.

Today and Tomorrow in Air Pollution. 1967. *U.S. Dept. Health, Education, and Welfare, Public Health Service Publication 1555.* 28 pp., illus. \$0.35. The report points out that carbon monoxide, sulfur oxides, hydrocarbons, photochemical smog, and particulate matter, the principal air pollutants, are caused by our modern civilization and that even with the greater efforts at local and regional levels and state governments, more dollars for research and development, many more trained people, and bigger budgets for control programs make it possible to just stay even.

Federal Outdoor Recreation Programs. 1968. *U. S. Dept. of Interior, Bureau of Outdoor Recreation.* 224 pp. A descriptive index of outdoor recreation programs and services of Federal agencies, independent agencies, commissions, and councils. Part A summarizes the functions and services of nine cabinet-level departments and their 57 agencies, bureaus, services, administrations, and offices, and also of 36 independent agencies, advisory boards, commissions, and councils. Part B summarizes in detail 263 programs relating

directly or indirectly to outdoor recreation. Among these are programs involving resource management, grants, credit, technical assistance, regulations, coordination, information, training, and research.

New England Heritage, The Connecticut River National Recreation Area Study. 1968. U. S. Dept. Interior, Bur. of Outdoor Recreation. \$1.00. Beautifully illustrated, this study reveals that the Connecticut River Valley contains the resources, potentials, and needs which meet the criteria for a National Recreation Area. The study's action plan proposes the blending of a small amount of land acquisition with scenic easements, conservation zones, and cooperation at every level of government and private responsibility, to preserve and enhance the outstanding character of the river and to take maximum advantage of the recreation potential of the river for the future.

Science and Improving Our Environment. 1967. USDA Agr. Res. Serv. [12] pp., illus. Shows how agricultural research helps prevent pollution in several ways: by protecting streambanks and using other means to prevent the silting of rivers, by disposing farm waste, by controlling pests with pesticides as well as using safeguards against over-use of pesticides, and by planning for the control of radioactive fallout should it occur in the future.

Crop Yield Response to Fertilizer in the United States. By D. B. IBACH AND J. R. ADAMS. 1968. USDA Statistical Bull. 431. 295 pp. \$1.75 Supplies one basis for current appraisals of the economic position of fertilizer use and to project economic potentials for fertilizer use and crop yields. The estimates show crop yield responses to fertilizer in defined areas.

Farm Costs and Returns, Commercial Farms by Type, Size, and Location. Rev. 1968. USDA Agr. Inf. Bull. 230. 77 pp., illus. \$0.55. Contains summary estimates of costs and returns for 1967 and other recent years for 32 important types of commercial farms in 20 major farming areas in the United States. Gives a brief analysis of changes that have occurred in production, prices, income, and costs for each type of farm.

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AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



America The Beautiful—Texas

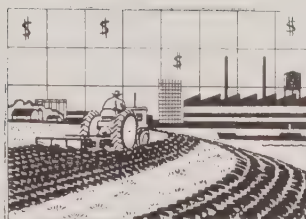
USDA SOIL CONSERVATION SERVICE

IRRIGATED COASTAL BERMUDAGRASS, SAN SABA-BRADY SOIL CONSERVATION DISTRICT

Full-color lithograph prints suitable for framing—one for each state, Puerto Rico, and Virgin Islands—are available from the Superintendent of Documents for \$0.10 each or \$5 for set of 52. Obtain order blanks from your local SCS or post office.

From the Administrator:

Conservation and Economic Development



From the beginning of the Soil Conservation Service, conservation and resource development have been tied to economic growth.

A proper mix of resources, people, and investments results in job creation; higher disposable income; higher quality food and water; better homes, schools, highways, and community facilities; and other elements essential to an improved environment.

As the technical agency responsible for advocating proper land and water use—and the conservation treatments associated with such uses—SCS provides valuable technical assistance to individuals and local sponsoring organizations in their conservation planning and actions.

In recent years, we have witnessed a rapid change in the economic life of our Nation. Increasing population, a higher income level, and more leisure time have increased demands and competition for space—not only for our basic needs of food, clothing, and shelter, but also for the physical expansion of housing, industry, community facilities, and the like.

Progress in science and technology has highlighted the need for a planning horizon that looks beyond the individual farm or other single tract, and even beyond group enterprises. A promising economic climate in many areas requires proper use and development of land and water resources on a regional scale.

Programs of this scale require special care in planning for action if high-quality communities of tomorrow are to materialize. Planning must be long range and based on a sound evaluation of existing

physical, social, and economic conditions. Planning must consider the needs of agriculture, industry, business, and other interests of people that are in keeping with accepted land use and resource capabilities.

Adequate soil and water information is vital during planning as the base for choosing among land uses. We have adequate land for all of these purposes, but we need to be selective in determining the most appropriate uses of land.

The role of SCS and conservation districts in economic development of communities is increasing. The Watershed Protection and Flood Prevention Program—now about 15 years old—and the Resource Conservation and Development projects are creating new opportunities in and beyond rural America.

New industries providing more and better jobs are coming to communities that have a dependable water supply; flood prevention permits more intensive use of watershed lands for agriculture, forestry, housing, and community facilities; and recreation developments provide opportunities to local residents in their home communities for sports and relaxation. Multiple-purpose watershed reservoirs with municipal and industrial water storage are triggering unprecedented economic growth and full employment in many communities today.

Flood protection, recreational opportunities, and water supplies draw industrial firms to a project area or encourage firms to expand, producing more economic goods and more jobs. Many industries have remained in the community only when assured by local leaders

that problems of too much or too little water would be solved. Often these firms are the lifeblood of the community.

Community facilities such as water mains and sewage treatment plants can be properly located once flood hazards have been reduced.

Local processors of farm and forest products have benefited from assured supply and quality of the essential raw materials—made possible through effective application of conservation treatment and modern technology.

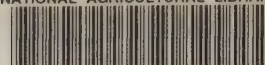
Most important, a community effort such as a watershed or RC&D project creates an attitude of cooperation among people who work together on mutual resource problems. This cooperative spirit continues into other community projects essential to economic growth.

The effectiveness of conservation activities or systems involving public or private investments increasingly will be measured in terms of their contribution to improving the quality of life for all people. We need to know more about that contribution and how to measure it:

- Economic activity relating directly to the total conservation investment costs, and those occurring annually;
- Expansion of private conservation investments triggered by public investments;
- The multiplier effect on the economic health of the community; and
- The effect of what we now must term “intangible” benefits that accrue from all our work.

Our aim must be to help communities and regions reach the proper mix of people, natural resources, and capital that will enable them to attract an equitable share of the Nation's industrial, commercial, agricultural, and social well-being.

D. A. WILLIAMS



If your address changes, please notify us of your complete new address, including Zip Code number, and include old address with our code number as shown above.

They added water for fun . . .

Indiana enjoys first Public Law 566 recreation lake

Montgomery, Ind., has met the challenge and now enjoys the rewards of building a recreation watershed lake.

The lake attracted an equivalent of 17,000 people during the summer of 1967. The sale of season passes to the beach totaled more than \$1,200. The concession stand sold out several times, more picnic tables were added to meet the demand, and all 15 campsites were filled when weather was favorable.

The Montgomery Recreation Park is part of the 89,000-acre Prairie Creek Watershed Project in Daviess County authorized for operation in May 1958. The project included 11 flood-prevention structures and about 40 miles of channel improvements.

The idea for a multipurpose dam for recreational use came in 1962 when Public Law 566 was amended to permit 50-50 cost-sharing on recreation facilities. Even with this help, when the Soil Conservation Service presented the Montgomery Town Board, the Conservancy District, and the Daviess Soil and Water Conservation District with an estimate of expenses, town board members decided the community of 350 could not bear the local costs to sponsor the recreation development.

Many citizens were convinced that recreation was needed, however, and drummed up support through the Montgomery Ruritan



The Victor Beard and Noble Thompson families are typical of those who enjoy recreation facilities added to a flood-prevention project.

Club which offered to assume financial responsibility.

The Indiana Department of Natural Resources helped finance the cost of additional land and for raising the dam to give the lake capacity for recreation. Construction began in September 1965.

Montgomery Lake was dedicated in less than 2 years, in August 1967, as the first watershed multipurpose recreation lake in Indiana. More than 1,000 local and area people attended, including U. S. Senator Vance Hartke and Congressmen John T. Meyers and William G. Bray.

The recreation area includes a 26-acre lake and a 13-acre park. Other facilities are a beach and

bathhouse with concession stand, picnic tables and shelter house, boat dock and launching ramp, camping area and trailer sites with water, electricity, restrooms, shower facilities, and dumping station for travel trailers.

The Ruritan Club manages the park, using the revenue to pay off the \$50,000 it raised to meet the local cost. Success of the first season dictated that the club increase the beach area by one-third and add several campsites with water and electric outlets. But the hard-working people of Montgomery do not object to struggling with this kind of success.—JOSEPH C. BRANCO, work unit conservationist, SCS, Washington, Ind. ♦

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soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES



CONSERVATION IN CITIES AND TOWNS

A sampling of citizen action

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: A conservation pond in a suburban development in the Ontario Soil and Water Conservation District, N. Y., beautifies the environs of an office building and factory near Canandaigua.

In town . . .

Care of the land is a proper concern of people in cities and towns.

Recent issues of *Soil Conservation* (e.g., September 1968) have focused on soil and water problems of urban and suburban areas.

This issue spotlights examples of conservation action by people who live "in town."

Our invitation to SCS fieldmen to tell of conservation service rendered to urban residents brought examples ranging from small country towns to major metropolitan areas.

Metropolitan: Many major industries in the northeastern megalopolis are giving care to their often extensive grounds (p. 129) as solicitous as that of any rural resident.

Likewise, the city of Atlanta finds it desirable to treat soil and water problems on its modern airport according to a conservation plan (p. 123).

Montgomery County on the edge of Philadelphia uses soil surveys and SCS technical aid in much the same way as more rural areas in soil conservation districts (132).

And California has provided legal means for rapidly urbanizing areas to restrain the disappearance of open space (p. 127).

And rural: In the small cities and towns that still characterize most of America, citizens often act together for mutual conservation benefits.

Witness the citizens' council in Idaho Falls, Idaho, (p. 139) and Junior Chambers of Commerce in Fairgrove, Mich. (p. 128) and Hoxie, Kans. (p. 144).

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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ORVILLE L. FREEMAN, Secretary of Agriculture

JOHN A. BAKER, Assistant Secretary of Agriculture

DONALD A. WILLIAMS, Administrator, Soil Conservation Service

BEN O. OSBORN, Editor

GEORGIE A. KELLER, Production Editor

Prepared in the Division of Information, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C. 20250

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All wrapped up in vegetation and concrete . . .

A soil conservation and water-disposal plan now in effect on Atlanta's modern jet airport has brought greater safety to air travelers landing at the Georgia capital and great savings in maintenance costs to Atlanta taxpayers.

The plan was worked out in 1966 under a cooperative working arrangement signed by Mayor Ivan Allen, Jr., with the supervisors of the Upper Ocmulgee River Soil and Water Conservation District. The Soil Conservation Service provided soil surveys and technical assistance to the airport management the same as it does to other landowners cooperating with the district.

The airport's erosion problems were compounded when it became necessary to increase the length of runways to meet the needs of jet-powered aircraft.

Located in an area of rolling hills and valleys, the original runways were constructed without great difficulty on the more level areas. But to accommodate today's high-speed jetcraft, it was necessary to cut through hilltops and fill valleys. This created critical erosion problems on the resulting steep cut and fill slopes and borrow areas.

In addition, buildings and pavement on more than a third of the 2,000-acre airport greatly increased runoff water that soon carved a continuous pattern of gullies. Some

By G. Robert Peebles

Area conservationist, SCS, Decatur, Ga.

gullies became large enough to hide entire airplanes had they wandered off the runways.

According to J. H. Kimbrel, airport maintenance superintendent, four trucks and a tractor with a front-end loader were kept busy about 10 days after each heavy rain hauling dirt to fill washouts. This occurred about five or six times each year.

The Atlanta City Prison farm had been given permission to use some of the undisturbed areas for crop production and to grow hay on the borrow areas. When Aubrey Thomaston, first assistant administrator of the prison, who had practiced conservation on livestock

farms, saw the erosion occurring on the farmed areas, he suggested to Airport Manager Grady Ridgeway that a conservation plan be developed for the entire airport.

The SCS conservationists found about 57 acres of cut and fill slopes, 500 acres in the safety zone, fuel storage, and related areas, 316 acres in borrow areas, and 300 acres in undisturbed areas that needed protection. There were 835 acres in paved areas and buildings that materially increased runoff.

Each area was considered separately to determine needed treatment. Various types of vegetation especially suited to controlling severe erosion were selected for the

Jet-age airport applies soil and water conservation for safety and economy



At right is a gullied borrow area between a cut slope on the left and fill on right that was a hazard to costly airport installations before treatment. Excellent cover of sericia lespedeza on side slope along runway pleases J. H. Kimbrel, airport maintenance superintendent (left), and Aubrey Thomaston, Atlanta Prison Farm official.

land areas. Masonry drop inlets were planned to get the surplus water off the flatter areas into the natural drainageways.

Establishing the needed practices posed difficulties because ordinary equipment was not suitable for seeding the steep slopes along the runways. Hydraulic seeding equipment was obtained to apply seed, fertilizer, and mulch to these areas.

Now, almost 2 years later, most of the area is covered with lush permanent vegetation. This, along with drainage outlets, has just about solved the complicated water-disposal problems at the airport.

Maintenance Superintendent Kimbrel, who lives near a waterfall on a stream below the airport, rests easier now. "Before we started this work," he said, "I'd sit on the porch at night after heavy rains and listen to the water carrying truckloads of soil from the airport. I dreaded the thought of having to spend days hauling other dirt back to replace it. Now I don't have to worry about that anymore."

Assistant Airport Manager Ken Malone noted, "The hydraulic seeder has more than paid for itself. Not only have we used it to seed the steep areas, but its 1,500-gallon tank and high pressure pump make it useful as auxiliary fire fighting equipment and to clean runways." ♦

Conservation spots included in TV news

A visit to the local television station news department by SCS area and district conservationists resulted in the filming and showing of conservation happenings on the regular news programs of Station KTBS—Channel 3 TV in Shreveport, La.

TV people and conservationists agree that the short "spots" are going over big with the station's some 70,000 viewers.

The idea was put into action when Area Conservationist Chester Bellard and District Conservationist Clint Harris visited News Director Orland Dodson last July. Dodson liked the idea and suggested that they start right away. A schedule for filming 12 programs was prepared by the conservationists.

The first film was made a week later. District Conservationist Harris had scheduled a team of SCS technicians to make soil borings and to survey an area on a district cooperator's farm that was being developed for ducks.

The station cameraman picked up Harris on his way to the site. About 5 minutes of color film was shot with the conservationists in action. Harris had already pre-

pared a script to accompany the film. The film was shown during the early evening news hour and again on the late evening news program that day.

Two weeks later the TV cameraman traveled more than 40 miles into Desoto Parish to film a 5-minute spot on the production of feeder calves on a conservation farm. Scenes of improved pastures, cattle, and calves on their way to market were filmed and used on the news program that day. The conservationist prepared information for the newscaster to use when the film was shown.

The third trip to the field was in mid-October. It dealt with cotton harvesting on conservation-treated land as compared to nontreated land.

Other scheduled items include fish deliveries for pond stocking, an RC&D project organization meeting, tree planting, soil surveys, and hunting on an area where wildlife food plantings have been made.

News Director Dodson says that he believes these spots add to the viewer appeal of the news program. "More outdoor scenes are needed to add variety to our programs," he said. "We are very pleased with the quality of the conservation spots and are looking forward to filming more in the future." ♦

Setting the suburban scene with ponds

Not many of us have the good fortune to live in the "new town" atmosphere of a Reston, Va., or a Columbia, Md., where beauty is implicit in the planning process and is expressed in architectural and landscaping excellence.

But, fortunately, the techniques for adding beauty and value to the landscape are available to most landowners. One of these is the conservation pond, a measure used with satisfying results by many residents of rapidly urbanizing areas of New York State.

On the larger lots near growing metropolitan areas, one of the first things many new landowners do is contact the local soil and water conservation district about installing a pond.

A pond of $\frac{1}{3}$ - to $\frac{1}{2}$ -acre surface area generally fits perfectly into the desire for recreation, nature appreciation, and a scenic and pleasurable vista. But the average size of ponds in New York is increasing, and many of 1, 2, and 5 acres or larger have been constructed with SCS assistance. These larger ponds have served as the nucleus for all kinds of development, and both sizes create values out of proportion to their costs.

In the township of Elma, an outlying suburb of Buffalo, the Erie County Soil and Water Conservation District assisted a landowner in constructing a 3-acre pond. The pond and its surrounding 5 acres of parkland served as the focal point for a 70-lot residential subdivision.

At present about 40 families hold membership in the Winch Lake Association and through an annual membership fee and contributed labor have developed a beach, floats, a diving board, a community shelter, and lighting for night swimming and ice skating.

Local residents estimate that the \$2,200 lake has increased the value of their properties by \$300 to \$500 each. The total enhancement of \$16,000 makes such a planning effort well worth the time.

Such income enhancement does not always accrue only to the land speculator and developer. In the Green County Soil and Water Conservation District, Maurice Beers, a cooperator who had been a dairy farmer, used SCS assistance to start a recreation enterprise. Mr. Beers built a 4-acre pond on a 50-acre tract valued at \$5,000. The pond cost \$10,000, making a total investment of \$15,000. Immediately after the pond filled, he was offered

Conservation ponds, large and small, add beauty and value to the New York landscape

By Robert L. Caldwell

Agricultural economist, SCS, Syracuse, N.Y.



\$50,000 for the land and pond—more than three times his investment!

These large enterprises are outstanding examples of the economic effects of conservation ponds, but what of the approximately 13,000 smaller ponds SCS has provided assistance for in New York State?

Donald Ogden of the Ogden Real Estate Agency in Walton estimates that construction of conservation ponds has increased the value of local properties by \$150 per acre. His company checked sales records for rural properties it had sold several times in recent years and found that after a pond was installed the selling price of the property commonly increased from \$50 to \$200 per acre. Ogden attributes the entire increase to the presence of the pond. Allowing for normal appreciation of land prices and for the average size of properties, this amounts to an increase in land value of about \$5,000 per pond.

Application of such figures on a statewide basis is risky, but they indicate the magnitude of this aspect of the conservation program in New York. If only the ponds built by nonfarm landowners in New York are considered, then 4,400 ponds costing an estimated \$3 million have generated a real estate base of \$22 million.

This base is taxable at the average statewide rate of \$30 per \$1,000 of market value and could generate a real estate tax revenue of nearly two-thirds of a million dollars annually.

Facts such as these indicate that when we talk about conservation ponds and money, perhaps we can have our cake and eat it too! ♦

Unprotected sand dunes destroy

Sand dunes move actively and relentlessly—when their vegetative cover is destroyed. They can spell trouble to highways and railroads, fill harbors or navigable streams, push into homes and communities, and encroach on farmlands and forests. ♦

Suburban Sam quizzes soils expert on radio

Suburban Sam is not a person—he's a radio program.

On the airwaves, Suburban Sam represents the suburbanite who calls the Soil Conservation Service office when he has a soil, water, woods, or wildlife question about the land he owns.

Suburban Sam was created 4 years ago by Duane Bosworth and Fred Merrill, then SCS work unit conservationists at Strongsville and Canfield near Cleveland, Ohio.

The conservationists had found that in serving their work areas with large urban and suburban populations, they spent much time on the phone repeatedly answering the same or similar questions. Bosworth and Merrill reasoned that more suburbanites could be reached by radio than by telephone. Thus, Suburban Sam was created to fill a definite need to make SCS work more efficient.

The Suburban Sam 4½-minute program is broadcast weekly over station WJW in Cleveland. Each week Sam, portrayed by Fred Merrill, has a problem on the small acreage he owns in the suburbs. He asks his soil conservationist, portrayed by Bosworth, how to solve the problem. Bosworth gives him the answers.

Because Merrill and Bosworth record their Suburban Sam radio program without benefit of a script, the public's reaction to their spontaneity is enthusiastic. Suburban Sam is a colloquial, stubborn character, often confused but earnestly seeking the right answers.

Radio station program directors endorse this Suburban Sam method of presentation because conversation holds listeners. One person speaking for the same time span is apt to bore today's listener who is



Fred Merrill (left) and Duane Bosworth run through program notes before a Socony-Mobil Research Laboratory, ex-Cleveland Station WJW's sound truck.

quick to spin the dial to something of interest.

Sam's land and water problems that have been "solved" on the program include such things as how to seed and hold an eroding slope, how to divert water away from his yard, how to build a pond for fishing and wildlife, and why tight soils keep his septic tank and leach field from working properly.

Sam (Merrill) and Bosworth have also discussed soil conservation districts, urban land planning, watersheds, and even traffic accidents resulting from mud on the highway that had washed off a bare soil area in the process of development.

Originally Suburban Sam was heard only in Cleveland and Youngstown. In recent years six other radio stations in Ohio have begun airing the program.

Bosworth has gone on to another job as a public information specialist at Portland, Oreg., but Merrill as Suburban Sam continues to put his questions to the new conservationist, Robert W. Smith of Bucyrus, Ohio. ♦

California's Land Conservation Act



Former orchardland of capability class I and II below the Contra Costa Canal is now covered with houses. The stockpond stands as a witness to an agricultural history.

By John H. Miner

State soil conservationist, SCS, Berkeley, Calif.

Each day California gets 1,600 new people and puts 385 acres under pavement or buildings. At such a rate does California's expanding cities encroach on the state's prime agricultural land.

To conserve agriculture and open space, land planners and decision makers have tried zoning, development easements, and other land-use controls enacted at the local level. But these efforts generally failed to preserve productive lands, natural

beauty, and open space.

In 1965 the California legislature enacted the Land Conservation Act, sponsored by John Williamson, assemblyman from the agriculturally important Kern County, and the members of the Assembly Agriculture Committee.

Land Conservation Act

The act provides a basis for voluntary action by the landowner and Government with assurances that

designated land will be treated and taxed as farmland.

The act recognized two major agricultural land types: prime and nonprime land. Prime land is Class I or II in the Soil Conservation Service land-capability classification, or land that has produced in 3 of the preceding 5 years unprocessed agricultural crops worth \$200 gross per acre before processing. Nonprime land is land that does not qualify as prime land.

For lands to qualify under the act, they must be in an agricultural preserve. These are areas devoted to agricultural or compatible uses, such as recreation. The local government, usually the county, establishes the preserves which may contain both prime and nonprime land and can be any size in excess of 100 acres.

When the preserve is designated, the local government is ready to enter into contracts with owners of prime land or into agreements with owners of prime or nonprime land.

Contracts on prime land

The contract limits the use of prime agricultural land to agricultural uses for a definite period of years, with a minimum of 10 years. Unless a special request is made by the landowner or the local government, the contract is automatically renewed each year. A contract can be canceled by the mutual agreement of the landowner and the local government with approval by the state director of agriculture, if the cancellation is judged to be in the public interest.

The contracts are transferable to subsequent property owners and do not restrict the sale of the land, but the land continues to be subject to the contract provision of agricultural use.

The act recognizes agriculture as the best use of this type of land and provides for favorable tax treatment. If the assessed valuation increases during the contract period, the landowner is compensated by the county \$5 for each \$100 increase. Since the county's share of the tax on \$100 increase in valuation is usually considerably less than \$5, the effect is to freeze the valuation on contract land.

Nonrenewal, as opposed to cancellation, can be carried out by either contracting party. If not renewed, the existing contract remains in effect for 9 more years, then 8, and so on. As a nonrenewed contract approaches the end of its term, the assessed valuation may in-

crease, and as a result, the county will receive a greater return than it will be called on to pay out.

The State of California assists local governments with the administrative costs of the contracts at the rate of \$1 an acre per year. To be eligible for this payment, the local government provides the California director of agriculture with maps and descriptions of land within the agricultural preserve and tracts under contract.

Agreements on nonprime land are entered into voluntarily by the landowner and the local government. The land must be in an agricultural preserve to be eligible for an agreement. There is no compensation under this arrangement and the term of the agreement is determined by the landowner and local government.

By the terms and firmness of the agreement, the assessor can determine the valuation for tax purposes, which will generally be based on agriculture or a compatible use. This more favorable tax climate for the landowner is the primary benefit derived from the agreement.

As of November 1, 1968, 24 of California's 58 counties had established agricultural preserves in compliance with the act. There were 2,084 acres under seven contracts and about 2 million acres under approximately 1,700 agreements.

State constitution amended

California's effort to protect open space was further strengthened in 1966 by an amendment to the state constitution to provide for tax assessment practices "to maintain, preserve, conserve, and continue in existence open space lands for food and fiber production, recreation, and beauty."

The California Land Conservation Act and the Open Space Conservation Amendment are beginning to be effectively applied as a means of maintaining the desired balance between conflicting needs for land. ♦

Jaycees start project for a village park

In 1966 when the Fairgrove Junior Chamber of Commerce was organized, their first project was to make a survey to find out what the local people really wanted most. The answer was, "We want a park of our own."

Residents of Fairgrove community, Tuscola County, Mich., in the heart of one of the state's most productive agricultural areas, had no nearby place for an outdoor group gathering or even a family picnic.

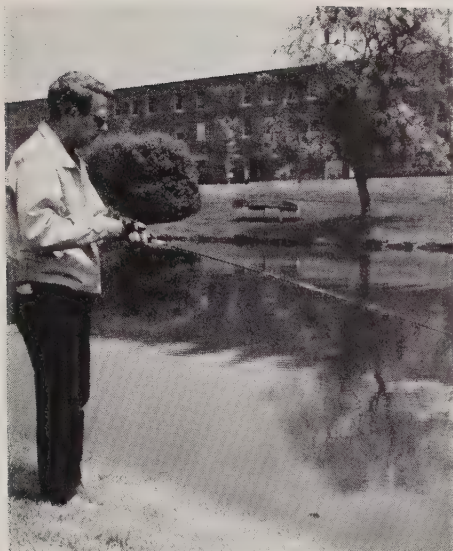
So the Fairgrove Development Corporation was organized, and citizens used their own money to purchase a tract of land on the edge of the village. From this, the Fairgrove Village Council, guided by the choice of the Jaycees, bought 5 acres of wooded area with a stream winding through it. The Jaycees agreed to develop the park if the council would maintain it.

The village became a cooperator with the Tuscola Soil Conservation District and obtained planning and technical assistance available from the Soil Conservation Service.

SCS conservationists provided soil information and ran a survey to help determine the best layout for removal of excess water and to develop a conservation plan to utilize the full potential of the area.

In the meantime the Jaycees had been busy building picnic tables and swings. Now they went to work in earnest clearing trees and brush, reshaping the steeper slopes, and seeding the newly disturbed areas.

But progress is just beginning. The village is applying for a grant from the Land and Water Conservation Fund with the assistance of the Tuscola County Planning Commission.—L. WILBUR KELLOGG, *district conservationist, SCS, Caro, Mich.* ♦



Dr. George Kerr, a chemist at the Socony-Mobil Research Laboratory, turns angler at lunch time beside the lab's 1/3-acre pond.

New Jersey communities share the benefits of industrial investments in conservation

By Samuel R. Race

Executive secretary, State Soil Conservation Committee, Trenton, N. J.

The New Jersey State Soil Conservation Committee has noted a welcome trend among big-name companies that own large amounts of local real estate. Indications are that industry is joining the movement to protect streams, vegetation, wildlife, and similar community resources for which agriculture has maintained traditional responsibility.

Although commercial interests sometimes have a reputation for consuming these resources, today some of them are among the strongest backers of soil conservation districts, watershed projects, and open space programs.

The Soil Conservation Service provides soil information and technical planning assistance to large industrial concerns that become cooperators with conservation districts in the same way it does to small individual property owners and farmers.

Industrial landowners have given vital support to a \$7 million watershed project launched on the Asunpink Creek which flows through the heart of Trenton. Flood relief, recreation, and water supplies will be provided with technical and cost-sharing help from the Soil Conservation Service.

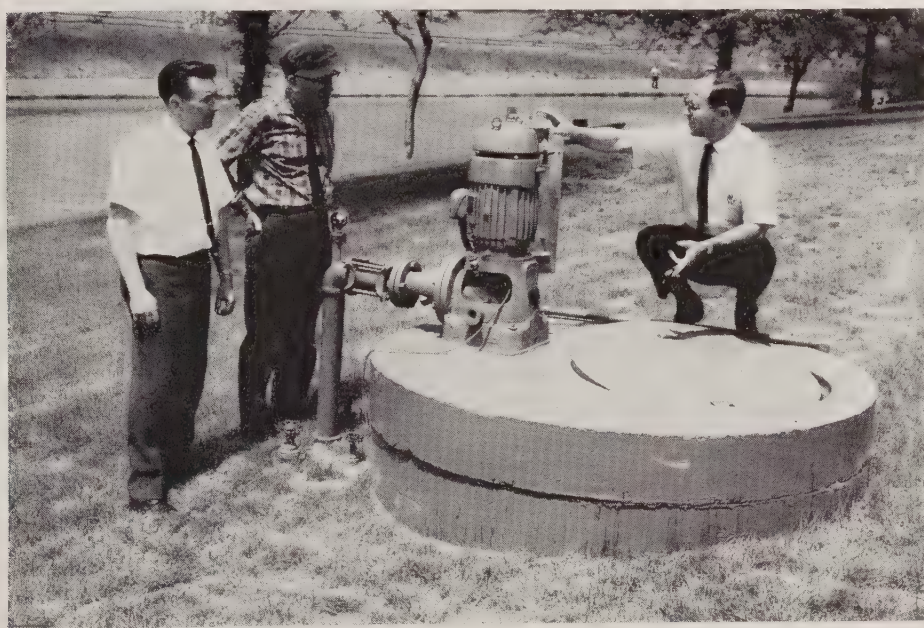
Local approval is required to con-

struct an elaborate system of dams, channel work, parks, and land treatment. Among the approving firms are Thiccol Chemical, Goodall Rubber, DeLaval Steam Turbine, Youngs Rubber, Crescent Wire, Pennsylvania Railroad, Stokes Molded Products, and Athert Machinery.

State soil conservation representatives recently sampled industrial land-management progress in Mercer and Somerset-Union soil conservation districts and found that conservation planning is a must with many of the research-oriented firms of the area.

For example, American Cyanamid has spent \$75,000 on an 8-year model land-protective plan for 640 acres surrounding the company's agricultural research laboratories at Clarksville. It includes several miles of erosion-preventing terraces, extensive wildlife plantations, and a newly built pond supplying millions of gallons of water for irrigation, livestock, and poultry.

Harold Hartwick, Cyanamid's farm manager, says their conservation plan has proved to be both economic and flexible. "We often



William Campbell, manager of the Socony-Mobil Research Laboratory, explains a multipurpose cistern and pumping unit to Vincent Lafferty (left), foreman, and Harry Slayback, district conservationist, SCS.



Robert Avery, superintendent of grounds for the Educational Testing Service, Princeton (standing), shows wildlife food plantings to Harry Slayback, district conservationist, SCS.

have to adjust quickly to the sharp twists in research objectives," he said.

Mobil Oil Company makes unique use of a manmade pond on its 315-acre Central Research Division Laboratory in Hopewell Township. Treated water from the labs is stored for study before being released into the Stoney Brook watershed.

The response of bass and bluegills in the pond to the rods of lab employees during leisure moments also helps indicate whether there is pollution in the water leaving the plant.

William A. Campbell, Mobil's administrative supervisor at Hopewell, says the pond also is a stop-over for wild ducks and geese on their migratory flights.

Similar programs are operated by Merck Institute at North Branch and CIBA (Chemical Industry of Basle, Switzerland), at Three Bridges.

Both firms have invested in soil and water saving practices to protect research work in pharmaceuticals. Curbing of pollution in the

Raritan River watershed is one example of benefits to surrounding communities.

Dr. Douglas C. Maplesden, director of CIBA's research station, has established a conservation system of grassland and water controls on 360 acres. In the 6 years since the company purchased and combined four adjacent farms, almost 4 miles of water-diverting terraces have been built. Trees have been planted on 12 acres.

CIBA recently built two ponds—one for irrigation, recreation, and fish management and a second to check contamination in sewage from experimental animals. A third pond is planned for water storage, irrigation, and additional recreation uses.

Dr. Walter Cobb, director of Merck's research operations, has divided 215 acres into small grazing plots to help develop feed additives that preserve health and production in farm animals. In use for more than a decade, this program has won a national award endorsed by the Somerset-Union Conservation District.

Terraces protect all fields and add beauty to the local scenery.

At Educational Testing Service near Princeton a large pond is stocked with fish and offers haven to a flock of Canada geese. On 200 wooded acres of the 400-acre grounds, Robert P. Avery, superintendent of land and buildings, pursues a program of forest improvement and protection. Grassland makes a handsome setting for office buildings used by the 750 regular employees.

ETS's wildlife conservation plan features large areas of food and cover plantings, such as hedges of honeysuckle, rose, and lespedeza. As many as 72 deer have been counted on the property. These, plus a large songbird population and numerous other forms of resident wildlife, attest to the program's success.

In keeping with their educational

aims, ETS makes its grounds available to nature classes and outdoor hobbyists, such as Boy and Girl Scout campers.

Superintendent Avery said, "Basically our aim is to keep the grounds natural looking and inviting to a public that enjoys open greenery. I should think any type of landowner would want to do as much."

The conservation committee's survey indicates there are increasing numbers of corporate landowners in New Jersey who share this belief. ♦

Boy Scouts use Ohio farm as conservation laboratory

An Ohio farm that once produced alfalfa hay and beef cows now provides a practical education in conservation for about 1,000 Boy Scouts from the Fort Steuben Area Boy Scout Council who use the farm for recreation and camping.

Council leaders signed up as a cooperator with the Harrison Soil and Water Conservation District after the council bought the farm about 10 years ago.

With SCS help they developed a conservation plan to protect the soil from erosion, provide camping and recreation sites, and developed the area for wildlife and woodland. Now, the entire farm is protected from livestock, and open fields are being planted to pine trees. The camping and recreation areas will be maintained in grass cover.

These practices provide watershed protection for Clendenning Lake, one of the lakes in the Muskingum Watershed Conservancy District.

The farm offers urban youngsters, who have never had the opportunity to plant trees and grass, a chance to practice conservation where the beef farmer left off.—EARL C. NELSON, *district conservationist, SCS, Cadiz, Ohio.* ♦



Upwards of 100 new homes have been built in the Lincoln area since the town's water supply went into operation.

Water for a thirsty town pumps new life into economy of a watershed community

Add abundant pure water to a thirsty town and you will get instant economic growth and opportunity, according to business and civic leaders of Lincoln, Ark.

Water-short Lincoln turned the valve on a new water source from a Public Law 566 multiple-purpose lake in January of 1964.

"The town started growing immediately," Mayor Roy Jackson asserts, "and with 2 million gallons of good water a day from the new source, it kept on growing."

The Lincoln water system was fed until recent years by a spring which produced about 100,000 gallons a day. This gave the little town's water subscribers an average of about 200 gallons daily—inadequate in view of the service stations, restaurants, and other businesses that required several thousand gallons a day each.

In 1960 the Washington County Soil and Water Conservation District and other sponsors were working on a watershed protection and flood-prevention project for the Muddy Fork of the Illinois Creek

watershed, in which Lincoln is located. The plan, authorized in 1961, contained provisions for a multiple-purpose water supply and flood-detention lake, with Lincoln paying for the easements and extra cost of construction over and above that needed for flood detention.

For 2 years, water users had to eke by on what they could get. During the dry summer of 1962, volunteer firemen lived in constant fear of an outbreak and Water Manager Jack Cox had to resort to tank trucks to keep Lincoln alive.

Rains started filling the new lake before New Year's Day of 1964, and water at last filled the thirsty pipes of the Lincoln water system.

C. C. Karnes was contracting officer for the sponsors during the construction of the lake, and as an officer in the Bank of Lincoln has kept his hand on the strengthening pulse of the town's economic growth.

"The changes are visible to the naked eye," Karnes says, "because we do not have a lot of empty stores and buildings staring at us

now. We have had about 20 new or expanded businesses since we obtained our new water supply—not counting industries.

"Our bank assets have grown by more than \$2 million since the new water went into our pipes—most of it in new deposits.

"Upwards of a million dollars worth of new homes—nearly 100 houses—have been built or are under construction. The expanding benefits of these new homes touch building supply houses, appliance dealers, grocery stores—in fact all of our businesses.

"The largest industry to be attracted is a new food processing plant. It will employ 225 people at first, and eventually 450.

"This one industry will use eight times as much water in its operations each day as the town's total supply before the watershed project," Karnes said.

Probably one of the best indicators of Lincoln's growth since 1963 is the Lincoln School District tax assessment. In 1963 it was \$2,405,634. Now it is \$3,021,376. ♦

An alliance for suburban planning

Conservation district and planning commission find soil information the key

The soil conservation district and the planning commission in Montgomery County, Pa., form a natural alliance that is bringing order to development of housing projects, shopping centers, and industrial and office complexes spilling over the line from metropolitan Philadelphia.

Key to the improved planning is soil information provided by Soil Conservation Service professionals assigned to the Montgomery County Soil and Water Conservation District.

The conservationists help the Montgomery County Planning Commission interpret the resulting soil surveys into scientific guides for orderly community expansion.

To secure the mapping quickly, the commission endorsed contributing \$30,000 in county funds to speed the work. As a result, the county survey was completed 10 years ahead of the original schedule.

The county has also contributed \$35,000 to expedite planning of the Wissahickon Creek Watershed Project to reduce flood damages along the stream shared by adjoining Philadelphia County. Eventual construction of nine earthen dams along the Wissahickon will provide multipurpose benefits in flood prevention and recreation, fish and wildlife habitat, and increased water supplies.

An example of the new co-operation is a model flood-plain development ordinance completed by commission experts and recently submitted to the county's 62 communities.

"Here is another step in our drive to take the guesswork out of planning," Commission Director Arthur E. Loeben commented. "The ordi-

nance is designed to keep homes and industries out of the pathway of flood damage and perennially wet basements. It is based on scientific interpretations of soil survey data now available to the county."

Already, 40 communities have used the interpretations prepared by William Plutte, principal planner, to translate soil information into specialized maps requested by the various townships and boroughs. The maps and supporting tables point out limits and potentials for building construction, roadways, onsite sewage disposal, water supplies, and similar community features.

Planned open space for recreation and a pleasing environment

have become a top consideration for the planning commission in a county where population has increased 50 percent in a decade.

Planning Director Loeben feels that much of the remaining charm in the county's grassy valleys, wooded hills, and rolling farmland, little changed from colonial days, can still be maintained. The new conservation maps help pinpoint such areas.

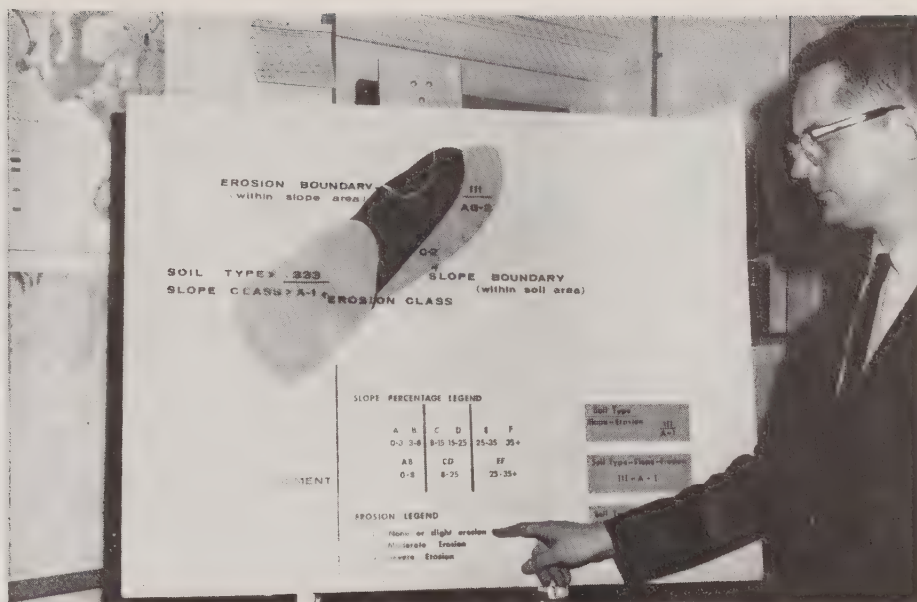
Among these are 46 golf courses, comprising 9 square miles of attractive open space. Last year, the commission campaigned to save golf courses from the tidal wave of development by encouraging public purchase. Several townships acted immediately, found the idea

Industries and shopping centers along the Pennsylvania Turnpike take up much of the once-rural land in the Wissahickon Creek watershed. David Witwer (right), formerly of the Montgomery County Planning Commission, discusses significance of soil information with Robert V. Smith, SCS soil scientist who helped make the survey.





Jute matting is rolled into place to line a newly seeded grassed waterway to help carry runoff from the Willow Grove Naval Air Station.



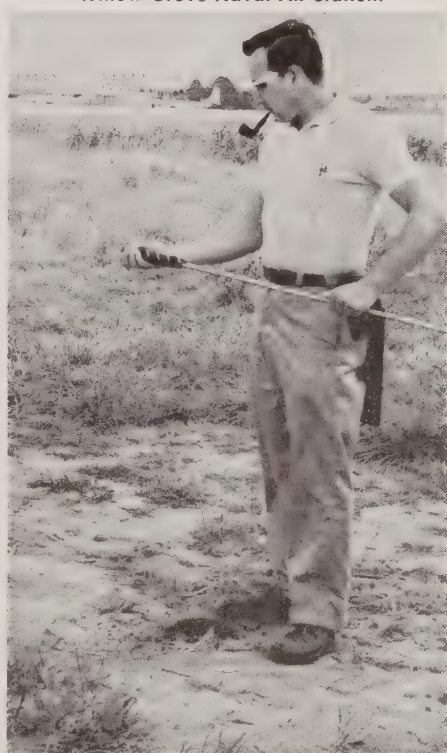
The planning commission uses many visual aids to explain soil facts and water management to citizen groups. David Witwer, cartographer, explains one interpreting the legend on soil surveys.

worked, and provided a fresh source of municipal income.

"Actually, district work and that of the planning commission complement each other in many ways," says Frank Ebert, chairman of the Montgomery District. "We support their countywide efforts by giving

technical help to individual landowners, whether they're farmers, industrialists, recreation-operators, or just plain suburbanites. We are delighted with the opportunity to help with the problems of land undergoing change from rural to urban uses." ♦

Soil left bare during the construction of new houses is subject to erosion and a source of sediment, a matter of concern to the planning commission.



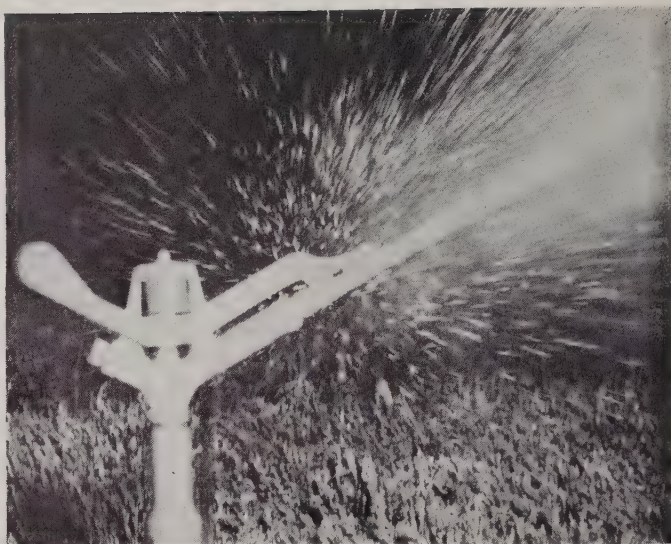
SCS Soil Scientist Robert V. Smith examines the soil near runway on the Willow Grove Naval Air Station.

Sprinklers in the night . . .

Keeping Jack Frost off the cranberries

By Henry J. Ritzer

Soil conservationist, SCS, Middleboro, Mass.



Massachusetts cranberry growers are turning on new systems to foil Jack Frost, a destructive visitor in the bogs on chilly New England nights.

It's done with sprinklers, and water needs are cut as much as 90 percent from the old flooding method. It works something like this:

"A dangerous frost tonight with probable bog temperatures of 20°-25°" warns the Massachusetts Cranberry Experiment Station and the Weather Bureau in a joint forecast, and the hardy cranberry-men bundle up and prepare for an all-night vigil on their bogs. They keep constant watch on bog thermometers, and when the temperature drops to freezing the men take action.

Until recently, the usual frost protection method has been to completely flood the bogs with water. Water raises the temperature and thus protects the crop.

"This method has been used since the industry started here in 1810, but it requires tremendous quantities of water," says George Andruk, production manager for the United Cape Cod Cranberry Corporation which operates more than 800 acres of bogs. "Today, cranberry growers apply the water through sprinkler systems. Designed with technical help from

SCS conservationists assigned to the Plymouth Conservation District, these systems cut water needs by about 90 percent."

With half of all the cranberries in the world raised in Massachusetts, this represents a big saving in water. Towns and industry will have more water available for their increasing needs.

Another advantage of sprinklers is their speedy operation. It takes time to pull flashboards or stoplogs to flood the bog, and this delay during a sudden temperature drop could mean a complete crop loss.

"We would have lost everything if we didn't have sprinklers," said Eno Laukkanen of Middleboro, after one bad night last May. "I

Carl Boutillier of SCS and bog owner Ernest Ellis (right) review plans for a sprinkler system and pump.





Ice-covered cranberries (left) are protected from frost. A reading of 35 to 40 pounds of pressure at the sprinkler head (right) indicates effective water dispersal.

checked the thermometer at midnight. It was 36°. I relaxed a little and thought we'd have a night without any trouble. At 1 o'clock I checked again and was jolted to find the temperature had dropped to 24°—12° in an hour. Immediately I started the pump. Within minutes we were protected. If we had to wait for the bogs to flood over we never would have made it."

During certain growing periods, a few hours of flooding can damage a cranberry crop as much as the frost. Cranberry flowers and tender new berries, for instance, will stand very little immersion. Sprinklers eliminate the immersion problem.

Using pumps instead of gravity flow from reservoirs means that ground-water supplies which are usually close to the surface in cranberry bog areas can be tapped by excavating dugout ponds for a reliable water source.

Besides frost control, the sprinkler water is also used for irrigation and insect and weed control. Flooding is still done to protect the vines during the winter.

SCS helps growers determine the best layout for the sprinkler heads as well as needed pipe and pump sizes. Usually the sprinkler system consists of aluminum main pipe and buried plastic laterals. Burying

the laterals keeps them out of the way of production activities and protected from the weather. The pipes are laid out so the sprinkler heads are on alternate staggered spacings about 60 feet apart. Water distribution should be uniform, especially for irrigating, because the shallow-rooted vines can vary considerably in production, depending upon available moisture.

The Agricultural Conservation Program cost-shares on part of the sprinkler system. Total costs to growers run about \$500 to \$600 an acre installed. Crop savings for 1 year can easily equal this figure.

In the last 3 years, cranberry growers in Massachusetts have installed more than 2½ million feet of irrigation pipeline, making significant progress toward better use of the state's water resources. ♦

USDA to join many groups in Lawn and Garden Week

Under the slogan "Growing With America," USDA will join many groups in observing the first National Lawn and Garden Week, March 20–26, 1969.

All levels of government, industry, garden clubs, women's organizations, youth groups, civic organizations, community service clubs,

homeowners, and occupants of houses and apartments are joining together to make more Americans conscious of the personal pride of accomplishment that comes from a well-kept lawn or garden. ♦

Florida has committee for range conservation

Far from the open ranges of the West, in space and in character, Florida grazing lands are getting the attention of a special Range Committee of the Florida Association of Soil and Water Conservation Districts.

Formed at the association's 1967 annual meeting, the committee has already been instrumental in establishing a range curriculum at the University of Florida. Courses of study have been formulated and instruction will begin in 1969.

The Range Committee has published a 10-page circular describing Florida's 10½ million acres of native grazing land and urging conservation measures.

Chairman of the committee is Lynn Harrison, a longtime Florida rancher and chairman of the board of supervisors of the Manatee Soil Conservation District.—L. L. YARLETT, range conservationist, SCS, Gainesville, Fla. ♦

Fire prevention: A new job for plants

By Theodore E. Adams, Jr.

Soil conservationist, SCS Plant Materials Center, Pleasanton, Calif.

The Soil Conservation Service is on the lookout for fire-resistant plants that will help reduce the perennial fire hazard on dry lands in California.

The SCS Plant Materials Center at Pleasanton, Calif., is conducting a plant evaluation program in cooperation with the U. S. Forest Service's Southwest Forest and Range Experiment Station to find plants that produce small, slow-burning growth that will carpet fuel breaks, heal fire-scarred watersheds, reduce fire hazards around urban developments, and improve wildlife habitats.

Mature native vegetation of this area is not fire resistant and each

year thousands of acres in California are ravaged by fire. The price in deaths, property damage, and lost resources is high.

The search for fire-retarding plants is being extended worldwide. Promising collections from foreign sources will be planted at Pleasanton and other California locations. The largest source of test plants is the collections in SCS Plant Materials Centers. Perform-

ance and usefulness of each new collection will be determined through a systematic plant-testing program.

More than 200 plant species and strains are included in these evaluations. When plant adaptability and physical suitability are determined, selections will be tested by the Forest Service to determine their flammability and the factors that influence their burning qualities.

Dr. R. H. Ruff (left), University of Nevada, examines prostrate *Ceanothus*, a low-growing perennial under test for plantings on brush-cleared areas, in southern California. A Forest Service technician (right) examines test plantings of wooly nama at an experimental site established by the Forest Fire Laboratory.



Several of the collections already have been provided for flammability determinations.

Conservation uses

Although fire retardant plants are not yet available, certain conservation practices can reduce the damage from wildfires in the 20 million acres of California brushland. For example, fuel-breaks can be established in brush cover by using chemicals, heavy construction equipment, and controlled burning. These fuel-breaks provide fire fighting crews the necessary access in brushland.

Additional steps are necessary to maintain the fuel breaks. Short, low-volume plants such as grasses and legumes should be planted to control erosion and help retard re-invasion by brush. Many dryland areas in California will need phosphate or sulfur when legumes are planted. Selective chemical sprays may be required to kill brush sprouts and seedlings.

Plants for reseedling

In California, grasses and legumes are used extensively to reseed large burned-over areas. Properly selected species germinate when the first rains fall in October and November. Although the protection against erosion they provide is not as effective as desired the first season following a fire, flooding and erosion damage during subsequent seasons are greatly reduced.

Use of several grasses and legumes for replanting projects in California is encouraged. Blando brome grass, an annual, and Lana vetch, an annual legume, are useful in northern California when mixed. Many areas of southern California have found Wimmera 62 ryegrass and Cucamonga brome grass, both annuals, to be effective.

Plants have long been used to repair fire damage. Now technicians in the SCS and the Forest Service hope to use them to prevent this extensive damage. ♦

Grass, water, management make a paying pasture



Capper Alexander (left) and Tom Bargsten show cattle grazing in irrigated pasture.

A good seeded pasture, plus good water management, fertilizing, and pasture management, makes it possible for Capper Alexander of Fruita, Colo., to say, "Good grass is cash."

In 1965, Alexander and Soil Conservation Service people worked up a farm conservation plan that called for converting his farm from row crops to irrigated pasture.

Alexander launched a land-leveling program as the beginning step. It involved combining many small fields and reorganizing the irrigation system.

He then established a good even stand of grass by preparing a firm seedbed after the fields had been leveled. A seed mixture of about 10 lbs. per acre of brome, orchard-grass, Alta fescue, and Ladino clover was planted very shallow. He believes deep planting is one of the main reasons why many people lose their grass or have only a partial stand and think that irrigated pastures will not pay their way.

Since leveling his farm, Alexander is realizing more use from his water. One ditch serves the entire farm. He can set almost $1\frac{1}{3}$ as

many rows as before, covering one-third more area each time the water is changed. He can change the water more frequently, and irrigating now requires about $\frac{1}{4}$ the time it formerly did. He fertilizes twice a year at a rate of 110 units nitrogen per acre. Improved irrigation helps here, too—it would mean a substantial loss in dollars if the fertilizer were allowed to "wash down the drain."

"It's impossible to realize a dime from pasture unless it is fenced and managed," says Alexander. He has installed a system of cross-fences and divisions. With these, he can irrigate one division while the cows are harvesting another, and still another irrigated division is growing and waiting its turn to be grazed.—JAY COLLINS, *district conservationist, SCS, Collbran, Colo.* ♦

Urbanization in reverse

The Hawaiian Commercial and Sugar Co. is tearing out 421 acres of blacktop, concrete, runways, and taxi strips that had been used as a naval airport and will plant the land to sugarcane next spring. ♦

Go-to-grass farming puts weight on cattle and money in pocket for Dakota stockman

By **Walter N. Parmeter**

Conservation agronomist, SCS, Huron, S. Dak.

Stockman Cliff Reyelts, of Britton, S. Dak., foresees nothing to equal his conservation grassland program for putting weight on his cattle economically.

During the fall and winter when the range turns hard and crisp, he buys 500 head of 400–500-pound calves. He feels assured that after munching all the silage they can eat, plus a pound of protein supplement a day until the grass comes up, they will reach finishing weight during the summer on pasture alone with little trouble.

Technical help

In putting a large portion of his 1,800 acres to grass, Reyelts used SCS technical help available through the Marshall County Soil and Water Conservation District.

The Reyelts farm and ranch ranges from a sandy to a medium textured soil, mostly on gentle slopes. The home section of land produces silage and winter feed for calves, while the outlying parcels have been planted to grass. Contoured rows, terraces, grassed waterways, and tree windbreaks complete his conservation program.

After being wintered on silage and supplement, the calves are able to reach weights of 800 to 950 pounds in the next 5 months of grazing.

In early spring the calves are put on 40 acres of crested wheatgrass pasture when it is 6 to 10 inches tall and are kept there until it is grazed down to an average of 3 inches. Then, they are placed on a mixture of smooth brome and alfalfa and rotated from one pasture

to another as the condition of the grass permits.

Grazing of brome and alfalfa begins between the time the brome is about 8 inches high until it is in the boot stage. All livestock are taken off when the grass is grazed down to 4 inches. A few days before this the pastures are clipped so the cattle will eat the cut foliage. The clipping prevents the brome grass from going to seed and evens up the plants for the next grazing period. All brome pastures are rested from 3 to 4 weeks following grazing.

Some pastures are cut for hay. The forage is cut shortly after the heads come out of the boot but before seeds are formed in order to

get maximum forage yield of highest protein content.

From middle July to about September 1, Reyelts places the cattle on his 33 acres of warm-season grasses of big bluestem, indiangrass, and switchgrass on Piper sudangrass. Through September and October the livestock are carried on 67 acres of Russian wildrye pasture and native range.

Legumes for protein

There are 250 acres of pasture that contain an alfalfa mixture. In the legumes Reyelts keeps bloat losses down by feeding a load of silage in the pastured area each morning. Reyelts believes the additional gain from higher protein legumes more than offsets any losses.

The cattle are watered by wells and three dugouts. Underground plastic pipe and an electric fence permit one well to provide water for seven pastures. Salt blocks are placed in the pastures to encourage more uniform grazing.

Reyelts says, "Fertilizing and killing weeds is my one-two punch to good pasture." Fertilizing the many pastures has become routine. He

Cliff Reyelts stands in a warm-season mixture of big bluestem, switchgrass, and indiangrass.





A field windbreak on the Reyelts' farm is a protective shelter for all seasons.

takes soil samples for chemical analysis and on this basis used 100 pounds per acre of 22-22-0 fertilizer on all of the pastures in 1968.

Weeds can be a problem but Reyelts sprays with 2-4-D where legumes are not planted. Annual weeds in the legume mixture are controlled by clipping.

A conservation plan

Reyelts feels that well-managed pastures are one of the best ways to build and conserve soil. Conservation has been a way of life for him for 30 years. Back in 1937 Cliff's father planted the first windbreak on the home quarter. Since then one-row field windbreaks have been established in a east-west direction every 40 rods across the home section of land. These trees reduce wind erosion, tend to hold the snow on the field for additional moisture, and make attractive wildlife areas for birds, deer, and small mammals.

Terraces are a part of Reyelts' overall conservation plan on the sloping land, and grassed waterways protect the terrace outlets. The terraces also serve as guidelines for planting crops on the contour.

The Clifford Reyelts family, his wife Gladys and their five daughters, approve of the "go-to-grass" program as it not only conserves soil, water, and wildlife but also provides more free time for the family to spend together. ♦

Citizens' council has beautification program

A citizen's council made up of representatives of civic organizations and of city, county, state, and federal agencies keeps the city of Idaho Falls and the county of Bonneville, Idaho, alert to beautification and conservation needs.

"Beautify Bonneville Council, Inc.," programs a year-round series of activities for litter removal, weed control, safety, and environmental improvement.

Their efforts have been so successful that they have just been awarded a silver bowl by Keep America Beautiful, Inc., for their outstanding antilitter campaign.

Started originally as a beautification advisory committee to the county extension agent, the group is now incorporated and organized into nine subcommittees responsible for cleanup, collection of trash, and beautification; collection and disposal of derelict autos; weed eradication; reduction of drownings in irrigation canals; establishment of parks in housing developments; beautification of roadsides and highway ditches; repairing and painting of buildings; disposal of abandoned buildings; and reclaiming swamps and dump areas for useful purposes.

The Soil Conservation Service

participates by providing information on establishment and care of vegetation, soil suitabilities, and erosion and sediment control.

The council promotes a "City and County Beautification Clean Up Week," declared by proclamation of the mayor of Idaho Falls and the Bonneville County commissioners to coincide with Soil Stewardship Week. Through all news media, residents are shown community problems and eyesores and urged to back the cleanup campaign.

The committee publishes detailed information on planting and pruning trees, shrubs, and flowers for beautification. Last year a farm and ranch safety campaign was promoted concurrently.

A lawn and garden clinic was held in June, stressing safe use of insecticides and weedkillers.

City and county ordinances relating to litter, weeds, and safety have been studied and discussed in council meetings. The result has been strengthening these ordinances through changes where needed, better public understanding, and improved enforcement.

According to Mayor S. Eddie Pederson, the success of the organization lies not so much in law enforcement as in gaining public recognition and support for beautification of the area.—JOHN P. OZMUN, *district conservationist, SCS, Idaho Falls, Idaho.* ♦

Public sewage facilities on increase in U.S.

On January 1, 1962, more than 44,000 communities in the United States were without public sewage facilities. From January 1, 1962, to March 30, 1967, 1,798 communities without public sewage facilities before 1962 either received approvals or made inquiries or applications to Federal agencies. During that period 649 grants, 191 combined loans and grants, and 14 loans were approved, as reported by USDA's Economic Research Service. ♦

Singing the praises of soil surveys



Village President Bob Atcher keeps an eye on construction in Schaumburg's developing areas.

Western Singer Robert O. "Bob" Atcher, who is also President of the village of Schaumburg, Ill., is singing the praises of soil surveys.

Schaumburg lies west of O'Hare Field on the fringe of Chicago. It is one of the fastest growing urban areas in America.

Builders in the Schaumburg area had run into unstable soil conditions which cost them dearly to correct. Contractors and village officials turned to the North Cook Soil and Water Conservation District for advice and found that technical assistance was available from the Soil Conservation Service in the form of soil maps and interpretations. Within a year, village officials had copies of interpretive maps and information on soil limitations and suitabilities for urban development.

"We plan to use soil information to set up building and construction regulations that fit our area," says Atcher. "We will also use soil data to locate potential parks and playgrounds for Schaumburg."

The village entered into a cost-sharing agreement with the Soil Conservation Service to speed up field mapping of Schaumburg

Township. It also helped pay the cost of labor and materials used by the North Cook Conservation District to prepare the legends and mount the maps.

Atcher says, "The areas that are severely limited for buildings show up so vividly on the map. We can now make educated decisions for growth of our community."—RICHARD DUESTERHAUS, *district conservationist, Lake Zurich, Ill.* ♦

Pond stops flooding and provides recreation

Every time a hard rain came, Delton Heath needed wading boots to get in or out of his Flowerland Nursery east of Broomfield, Colo.

A gradual drainage stoppage, widening of the highway in front of the nursery, an inadequate culvert under a driveway, and an increasing amount of paving in the 628-acre watershed all contributed to Heath's problem.

At Heath's request, SCS engineers designed a farm pond with an adequate spillway to divert floodwaters away from the buildings. He also pumps water from the pond to irrigate young nursery stock, and

his children have found it useful for swimming and boating.—ROSS L. CAMPBELL, *district conservationist, SCS, Boulder, Colo.* ♦

Departments join to upgrade rural housing

The Department of Agriculture will administer in rural areas new programs to upgrade housing provided by the Housing and Urban Development Act of 1968, under an agreement recently signed by Secretary of Agriculture Orville L. Freeman and Secretary of Housing and Urban Development Robert C. Weaver.

The agreement, authorized by Congress, is an extension of the "outreach" function of USDA that puts rural people in touch with services provided by other Government agencies.

Secretary Freeman designated the Farmers Home Administration to act as agent for HUD's Federal Housing Administration in making available to rural residents that agency's interest supplement loans authorized by the new law.

Interest supplement loans are designed for families in the lower income group to assist them in obtaining adequate housing. They will be funded by local private lenders at Federal Housing Administration interest rates. Loans will be available for purchase of existing houses, either new or renovated, or for construction of individual homes. ♦

Trout farming

Trout are a favorite food fish everywhere in the Nation. The rainbow trout is the most popular for fish farming. Cold water, and plenty of it, is required for trout production. Springs or coldwater streams must flow a minimum of 300 gallons a minute for successful trout cultivation. Well water and much spring water must be oxygenated. ♦

Cooperatives offer new agriculture directions

New faces in Washington and possible new directions for agriculture will be in the spotlight January 14-15 at the 40th annual meeting of the National Council of Farmer Cooperatives.

Newscaster Eric Sevareid will address delegates at a noon luncheon on "A Look at the New Administration." Oregon Senator Mark Hatfield will speak on "Politics Should Be the Concern of Everyone."

A panel discussion by four members of the House of Representatives will explore "Future Trends in Agricultural Legislation."

About 600 farmer cooperative officials from throughout the Nation will attend the meeting, to be held at the Washington Hilton Hotel.

Dates and places

January 14-15, National Council of Farmer Cooperatives, Washington, D. C.

19-23, American National Cattlemen's Association, Honolulu, Hawaii.

26-29, National Woolgrowers Association, San Francisco, Calif.

February

2-6, National Association of Soil and Water Conservation Districts, Atlanta, Ga.

11-14, American Society of Range Management, Calgary, Canada.

14-18, American Road Builders Association, Chicago, Ill.

15-19, American Association of School Administrators, Atlantic City, N. J.

16-19, American Pulpwood Association, New York, N. Y.

24-25, Sprinkler Irrigation Association, Annual Technical Conference, Washington, D. C.

24-26, Land Improvement Contractors of America, Grand Rapids, Mich.

28-March 2, National Wildlife Federation, Washington, D. C.

Population pressure on natural resources

The population in the United States in the last 100 years has grown five times over. This leaves less and less room for people and animals, houses and farms, cities and factories, trees and plants, clean water and fish, and pure air. ♦

Review



River Control and Drainage in New Zealand. By A. R. ACHESON. 1968. *Ministry of Works, New Zealand, Wellington, N. Z.* 296 pp., illus., maps. \$9.00.

This book provides both technical and historical information concerning the problems of river control and drainage in New Zealand. It briefly describes the physical features, hydrometeorology, and history and organization of river control and drainage in that country.

The watershed protection schemes there are patterned on, but not identical with, those developed in the United States by the Soil Conservation Service.

River control is effected by bank stabilization and detention structures. The book gives an excellent discussion of river bank stabilization, complete with illustrations and schematic drawings. Drainage is quite comparable to that practiced in the U. S.—EUGENE C. BUIE, director, *River Basins Division, SCS.*

Wastes in Relation to Agriculture and Forestry. By CECIL H. WADLEIGH. 1968. *USDA Misc. Publ. 1065.* 112 pp. \$0.60.

Wastes in Relation to Agriculture and Forestry, as an early paragraph states, "provides terse consideration to 10 major categories of entities that contaminate the air, water and soil of our environment. . . ."

These categories are sediments, chemical air pollutants, airborne dusts, plant nutrients, inorganic salts and minerals, organic wastes, infectious agents and allergens, agricultural and industrial chemicals, radioactive substances, and heat.

The conservationist will find the discussion of sediment and airborne dusts of special interest, particularly as to the accounts of research progress. Background on the de-

velopment and course of pollution problems is of further interest.

In Appendix IV's "Problems in Waste Management Needing Attention in Agriculture and Forestry," Author Wadleigh points out, "As America's technological giant continues to grow, it becomes ever more ravenous for better information. In doing so, this giant also casts a powerful spotlight over broad areas of ignorance—untilled fields that should be producing food for the giant. . . . The need for sound information relative to production, management, use, and control of wastes is so vast that no one responsible for direction of research in this area will ever emulate the U. S. Commissioner of Patents in the early 19th century who resigned from his post on concluding that everything that could possibly be invented, had been invented."

USDA Miscellaneous Publication 1065 is a landmark publication on the subject and should be a valuable reference in many a library.—T. A. JENKINS, *Information Division, SCS, Washington, D. C.*

Soil-Plant Relationships. By C. A. BLACK. 1968. 2d. ed. *John Wiley & Sons, New York.* 792 pp., illus. \$19.95.

This revision of a book first published in 1957 brings up to date a comprehensive and exhaustive review of the state of knowledge of nine important aspects of soil-plant relationships.

Each chapter considers current theories regarding the effects of certain soil properties on plant growth with impartial detachment. Most, it seems, are open to question, and one might conclude from skimming the book that little knowledge in soil science is conclusive at this stage. The lengthy lists of citations at the end of each chapter indicate the thoroughness of the review, and careful documentation in the text enables the reader to trace each point to its source.

The topics treated are soil characterization (i.e., texture, structure, mineralogy, and profile), water, aeration, exchangeable bases, soil acidity, salinity and excess sodium, nitrogen, phosphorus, and potassium.

The author admits in his preface that there are other aspects of soil-plant relationships of significance but explains that they were omitted because of lack of time to prepare them for inclusion. This is easily understood in view of the attention devoted to the ones treated.—B. O.

New publications

Key to the Native Perennial Grasses—Midwest Region East of the Great Plains. 1968. USDA, SCS-TP-151. 116 pp., illus. \$1. This guide was abstracted from Hitchcock's *Manual of the Grasses of the United States* (USDA Misc. Publ. 200) by plant scientists of the Soil Conservation Service's Midwest Regional Technical Center, Lincoln, Nebr. It includes species that occur east of the Great Plains in the area of responsibility of the technical center; i.e., the states of Michigan, Wisconsin, Indiana, Illinois, Minnesota, Iowa, Missouri, and eastern North Dakota, South Dakota, Nebraska, and Kansas. The selection should be equally applicable to most of the rest of the Northeastern United States.

The combination of the taxonomic keys and the illustrations from Hitchcock's manual, plus a few additional illustrations from the 1948 Yearbook of Agriculture and an annotated list of species giving information about environment, growth habit, and distribution, make a very convenient field handbook of grasses for the region. English names are generally from the second edition of *Standardized Plant Names*.

Within the region to which it applies, the guide will serve most users as an adequate substitute for the complete manual from which it is derived.

The Cost of Clean Water. 1968. U. S. Dept. Int., Federal Water Pollution Control Administration. 227 pp. \$2.50.

This report of a study on economic impact of costs of installation of treatment facilities required by the Federal Water Pollution Control Act presents and evaluates data on the requirements of state and local governments to meet those water-quality standards. It also appraises the financial and legal problems that will be encountered. The first section covers re-

quired capital outlays; the second, the ability of local governments to finance these outlays; and the third treats the legal constraints in financing. There are four technical appendixes.

To meet the needs of the growing population requires an expenditure of \$15 billion within the next 5 years, about a quarter of which can be financed from Federal grants. Small communities account for a disproportionate share of requirements and their units are generally more costly.

Grazing Intensities and Systems on Crested Wheatgrass in Central Utah: Response of Vegetation and Cattle. BY NEIL C. FRISCHKNECHT AND LORIN E. HARRIS. 1968. USDA Tech. Bull. 1388. 47 pp., illus. Crested wheatgrass can fill an important need for early spring grazing in the intermountain region. Under conditions at Benmore, Utah, crested wheatgrass may be grazed from April 20 to June 20 at an intensity of about 65 percent of herbage by weight. This intensity gives optimum cattle gains per acre and maintains grass production. Delaying the start of grazing in the spring contributes toward maximum basal area and yields of grass, and shortening the grazing season at the end of the spring growing season encourages maximum plant numbers.

Use of Water by Riparian Vegetation, Cottonwood Wash, Arizona. BY JAMES E. BOWIE AND WILLIAM KAM. 1968. U. S. Dept. of Int. Geol. Surv. Water-Supply Paper 1858. 62 pp., illus., with map in pocket. Includes a section on vegetation by F. A. Branson and R. S. Aro. A 4.1-mile length of the stream channel was selected and divided into a 2.6-mile upper reach and a 1.5-mile lower reach, and the change in water use as a result of the modification of riparian vegetation was measured. The computed average loss of water from the lower reach before modification was 80 acre-feet per growing season, a quantity which represented about 18 percent of the average flow entering the reach in the same period. The average loss after modification of the vegetation was 42 acre-feet per growing season, equivalent to about 12 percent of the average flow in the same period.

Soil surveys

Woodruff County, Arkansas. 1968. 60 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils surveyed by George H. Maxwell, James V. Clark, George R. Dahlke, and James E. Hoelscher.

Morgan County, Colorado. BY CLAYTON F. SPEARS, ALAN E. AMEN, LOUIS A. FLETCHER, AND LYNN R. HEALEY. 1968. 102 pp., illus.; maps 4 inches to the mile (1:15,840).

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



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USDA SOIL CONSERVATION SERVICE
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Conservation Concepts for the Future



In this, my last editorial for *Soil Conservation*, I should like to express some conservation concepts that I believe have relevance for the next decade or more. These concepts are based on the lessons of the 33 years' experience of the Soil Conservation Service in which I have shared and on the projected needs of our people in America.

(1) *Soil and water conservation is for, and is the responsibility of, all people.* This responsibility involves not only stewardship but also use and development to meet both short-term and long-term needs of individuals and of society.

Soil conservation is not peculiarly a farm program. True, farm and ranch owners and operators have a major responsibility to their community, state, and Nation to conserve the soil and water resources they use. Nonagricultural users of soil and water are equally responsible for managing their resources in the public interest also.

(2) *Government at all levels, speaking and acting for the people, must exert aggressive and effective leadership in soil and water conservation.* It must support this high-priority goal with financial resources fashioned to the need.

For 30 years soil and water conservation districts have provided a local governmental vehicle to lead and motivate conservation actions. Generally, they have done a marvelous job. But in most states, these districts need added authority and added resources to meet the task ahead.

Many county and state governments are using tax resources to help with the task, but few have yet to participate to the extent that the people's interest in protecting the basic tax resource requires.

Broader and deeper involvement is essential. Likewise, the Federal Government must more nearly gear its inputs to the needs of the times.

(3) *Conservation technology must be kept vigorous and up to date.* Professionally, the technical foundation for soil and water management has been carefully and soundly laid. The interrelated technologies with which to build the programs of tomorrow must be kept up to date with new research and experience. Fortunately, the same basic principles of soil, water, and plant management and the art of working with people are applicable to nonagricultural as well as agricultural uses of land. It has not been necessary to create new professions to do conservation, but it is continually necessary to build upon those we already have. The Soil Conservation Service must maintain professional as well as administrative integrity.

(4) *The emphasis in Soil Conservation Service program activities must be responsive to changing public needs.* The need for and fundamental soundness of the several programs for which SCS has responsibility have been publicly acknowledged and widely supported. The emphasis in application of these programs, however, has been under continuous change. From an initial concern with erosion control and moisture conservation almost exclusively on farm and ranch land, SCS now deals with community, multicounty, and regional conservation problems. This trend toward service to a broadened clientele will continue. For example, more attention must be given to sediment and other pollution reduction. Open-space and outdoor-living opportunities will need rec-

ognition and implementation.

The Soil Conservation Service in the future will need to be more selective in providing planning assistance to individual landowners and groups in order to be sure that planning is related to actual needs and to the readiness of responsible citizens for action. There will be need for more professional competence to work with community and broad area decision makers. Assistance to individuals in applying planned practices will come less from the Soil Conservation Service and more from non-Federal sources. Some organizational and staffing adjustments will be needed to meet changing program requirements.

(5) *Opportunities for people to live a satisfactory life will be found more and more in rural America.* Here the basic soil and water resources are the necessary foundation for a growing economy. Environmental factors of good soil, clean water, clean air, living space in an uncluttered landscape, and employment opportunities in both agricultural and nonagricultural endeavors will greatly influence the health and social behavior of our people. The wise use and conservation of soil and the conservation and development of water resources to meet the needs of a rural-urban society must have high priority in the years and decades ahead.

All in all, Soil Conservation Service people will be dealing with exciting and challenging opportunities in the years ahead. It would be mighty interesting for me to share these opportunities with you. But, my task has been to help lay the foundation; yours is to continue to build on it. Best wishes as you meet the needs of the years ahead.

D. A. WILLIAMS



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A neglected park becomes a recreation center under guidance of Jaycees and TAP panel

The western Kansas community of Hoxie, population 1,337, had a wooded "park" on the edge of town that was more misused than used and had more weeds and brush than grass.

Now, thanks to the leadership of Hoxie Jaycees, families are enjoying picnics in Buffalo Bill Park, and Girl Scouts are using the park for day camp and training sessions.

In 1967, the Jaycees sought planning and financial assistance through the Sheridan County Technical Action Panel. They were referred to the Soil Conservation Ser-

vice for planning assistance and to the Kansas State Park Authority for financial aid.

A long-range plan was developed by the Jaycee executive committee in cooperation with the Sheridan County Soil Conservation District.

Projects included: building and improving roads, placing posts and cables, removing certain trees and overhanging limbs, building five 12-by-12-foot shelter houses, installing charcoal pits, placing picnic tables and water fountains, and putting in swing sets, horseshoe pits, and a merry-go-round.

The Jaycees intend to carry out the projects by stages over a period of years, as finances permit. In 1967, they had a general cleanup, sprayed weeds, trimmed trees, and cut grass and weeds. As a Scout community improvement project, local Boy Scouts and Explorer Scouts helped with the cleanup.

In 1968, the Jaycees built roads in and around the park. The county donated sand for the roads and parking areas, as well as the use of bulldozers, graders, and other heavy equipment. About 1,800 feet of posts and cable were erected, too.

During the year, the Jaycees conducted several fund-raising projects to further the development of the park.—W. D. YOUNKIN, *district conservationist, Hoxie, Kans.* ♦

Buffalo Bill Park is now a shady oasis in the Kansas landscape frequented by picnickers.



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soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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Resource Conservation and Development Projects
Summary of SCS activities 1968

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: In a revival of a resource-based industry in the Tradewater RC&D Project in Kentucky, logs are being assembled into rafts to be floated down the Ohio River to a veneer mill.

Success . . .

RC&D projects across the country are chalking up one success story after another. No sooner had we published the many-sided account of the Lincoln Hills Project in Indiana (*Soil Conservation*, December 1967) than State Conservationist Ralph Sasser of Tennessee was asking equal space to tell the Hull-York Lakeland story.

It's different, as every RC&D project is bound to be, but it's equally impressive.

Our men on the ground, Project Coordinator A. K. Booher and Area Conservationist D. W. Moyer, gave us a detailed account of RC&D activities and accomplishments.

Then we sent Information Specialist Claude Crowley to talk to the people and report on the human aspects of the story. A former resident of the area, he was especially qualified to see and interpret the changes.

The resulting article is exceptionally revealing of the personal effort and dedication necessary to get a project underway and of the economic and human rewards that attend success.

Variety: We had space to publish only a few examples (pp. 155, 156, 157, 168) of the kinds of things that local people can do as "project measures" in RC&D projects.

The combination of imagination with the untold variety of natural resources in different geographic areas offers almost limitless opportunity for economic development.

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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CLIFFORD M. HARDIN, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

BEN O. OSBORN, Editor

GEORGIE A. KELLER, Production Editor

Prepared in the Division of Information, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C. 20250

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Farming in the Upper Cumberland landscape.

The Hull-York Lakeland story reveals many facets of a regional development program

“We have reduced flooding, saved jobs, beautified the countryside, and made improvements that raised the quality of our living.

“But the real story in the Hull-York country is how our people have been changed.”

Dr. L. R. Dudney is talking. He is president of the Hull-York Lakeland RC&D Association, prime mover and organizer of Tennessee’s 11-county resource conservation and development project in the Cumberland Highlands.

In the 2 years of the project’s operation, people of the area have completed 51 specific planned activities—“project measures” approved by the steering committee and aided in some way by financial or technical help—aimed at making better use of natural resources and stimulating the local economy.

The completed measures provided 275 man-years of employment during installation and are estimated to result in continuing employment of almost 2,000 man-years annually. Their economic benefits will add \$71½ million of gross income in the area each year.

Installation is underway on 32 other measures, expected to add another 820 man-years of continuing employment and \$10.8 million

gross income to the area annually.

This is a crude measure of the economic impact of the project in the early months of its operation.

But what of the “people effect,” as Dr. Dudney calls it?

“Only a few years ago we were Tennessee’s problem child,” he says. “We lacked confidence in the future. People left in droves. My home county lost a fourth of its population in the fifties.

“Those who left were generally the young productive people. The tax base shrank. Modern school rooms sat empty. Businesses closed.

“Now spirit is high. Good things are happening, some with and some without outside help—things that require coordination and common concern, qualities not evident before the project came to life.”

Dr. Dudney is motivated by a conviction that conservation, like medicine, deals with life itself. His drive for the project has had the ring of a deep love of the country and an insight into the character of the people who inhabit it derived from 20 years’ service as a country doctor after a career as an industrial physician. He retired from practice in 1965 and found a new fulltime career in resource conservation and development.

The roots of the Hull-York Lake-

What is an RC&D project?

“The real story is in how our people changed”

Dr. L. R. Dudney.



land area problems go back through a century and a half of isolation and exploitation.

Scotch-Irish frontiersmen settled the Upper Cumberland in the early part of the 19th century. These settlers had a traditional fear of government and religious persecution. They found the isolation and independence they were seeking in the vast highland forests.

While many of the pioneer clearings were still new, the Civil War came to the mountains. Few people owned slaves, but loyalty was divided. Bad feeling lingered in the border counties for the better part of a century and contributed much to the legend of the feuding clannish mountaineer.

In the latter 19th century, exploitation of the timber began.

Timber speculators viewed the forest as an unlimited natural resource. Conservation was unknown. Timber men bought the land or timber rights for very low prices. The woodlands were cut over—not once but several times.

Coal mining, too, started late in the 19th century.

Outside capital was used to develop the mines and build the mining towns. But most of the coal money went to investors and stockholders far away.

Coal from the Upper Cumberland helped fire the furnaces of war plants in World Wars I and II. Later, mechanization and higher wages made operating the mines unprofitable, and they began to close one by one.

Then, heavy machines were perfected and surface mining of coal became practical. The seams were often on steep land, high up on the mountainsides. The effect on the landscape was catastrophic. Trees, soil, and rocks slid hundreds of yards down the slopes. Each rain carried tons of debris into the streams, destroying their esthetic values and snuffing out the fisheries.

The farm economy of the area has always lagged.

Much of the land is steep with

shallow soils. Traditional row-crop farming did not produce a comfortable income at best, and erosion stole away the basic soil resource.

All of the problems of the Upper Cumberland country can be reduced to a lowest common denominator—their effect on people: First, in the number of people who moved away and, second, on the income of those who stayed.

Almost all migration has been out, not in. And there was less opportunity for those who stayed.

According to the 1960 census, eight of the 11 counties in the Hull-York area reported a per capita income of less than \$821. The median family income was \$2,178, about a third of the median for the Nation.

The beginnings

For more than 25 years soil conservation districts have been at work in the Upper Cumberland, and several watershed projects were being installed with the aid of Public Law 566. They made progress in stemming the wastage of soil and water, but the social and economic problems were beyond their reach.

About the time Federal legislation was passed in 1962 to aid resource conservation and development efforts, the outmigration, low income, and other problems were at their worst.

It took a while for the RC&D idea to be absorbed, but people were soon talking of an organization for the Upper Cumberland.

The regional concept of resource development was not new. It is basic to watershed and river basin programs and to large regional endeavors such as the Appalachian Regional Development Act and the Great Plains Conservation Program.

But the RC&D legislation brought to the Upper Cumberland, for the first time, a program both practical and flexible. It created opportunities for regional action in an area small enough for the development of a neighborhood

spirit. Common interests, problems, and language attracted people to the RC&D movement.

In mid-1964 a preliminary association was formed by people from Jackson, Smith, and Clay counties to seek assistance from the Department of Agriculture in organizing an RC&D project. Dr. Dudney was elected chairman.

Later the area was enlarged to include eight counties (Cumberland, DeKalb, Fentress, Macon, Overton, Pickett, Putnam, and White) to conform to one of the planning areas delineated by the Tennessee Planning Commission.

A Pulitzer prize-winning reporter, Nat Caldwell of the *Nashville Tennessean*, exposed problems and preached about the undeveloped assets of the area. He sparked interest from the National Educational Television Network, and a filming crew made a documentary of the area's problems and possibilities. The story was shown on 47 NET stations.

Coleman Harwell, editor of the *Putnam County Herald*, Cookeville, also sturdily supported the project with news space, editorials, and talent.

The organization

In October 1964, the RC&D project was organized under the sponsorship of the soil conservation districts. A permanent association was formed with Dr. Dudney as chairman of a board of two directors and two alternates from each participating county. For each county, one director is appointed by the soil conservation district and one by the county rural areas development program committee.

The following year was a time of frustration—and growth. Dr. Dudney traveled thousands of miles to civic club meetings, soil conservation district meetings, and any other gathering where he could tell people that they could and should help form a team to alleviate regionwide problems.

By the fall of 1965 the fire was

ready for the fat, as the saying goes. The project was authorized for planning in November.

Joe Couch, an experienced SCS soil conservationist hailing from nearby Warren County, had been appointed project coordinator just a month before. His job was to help the local people formulate their plans in terms that could be reviewed and evaluated by agencies and organizations that could be invited to participate.

For the plan-making process, the board termed itself a steering committee. It then appointed 11 "subject" subcommittees. These were for Agriculture; Arts and Crafts; Beautification; Community Facilities; Education, Health, and Wel-

fare; Fish and Wildlife; Industry and Mining; Recreation and Tourism; Transportation; Water Resources; and Woodland.

Subcommittees were staffed by soil conservation district supervisors, watershed directors, county officials, and other local leaders. The County Technical Action Panel (TAP) members and other professional people—soil conservationists, county agents, geologists, sanitarians, health officers, and others—were asked to work with these subcommittees as consultants.

"We took the program to the people," Dr. Dudley said. "Our committeemen and consultants traveled with me to about 40 informational meetings in courthouses

and schools. We invited questions and encouraged everyone to submit suggestions. About 1,400 people attended these meetings."

Organizing and planning took from November of 1965 until July of 1966. In October 1966 the plan was authorized for operations.

The Hull-York Lakeland Project has been in operation more than 2 years. How effective it has been is interpreted in different ways by different people. All agree that it has brought changes.

Among the most far-reaching, though perhaps the least spectacular, effects is that on the countryside itself through accelerated assistance to farmers and other landowners.

TV cameraman assumes an unusual stance as he films a documentary of Hull-York area's people and resources.





Sgt. Alvin T. York's old mill, now a part of Pickett State Park.

The average farm contains less than 100 acres and yields about \$1,200 annual income. About two-thirds of the area is in woodland.

The U. S. Forest Service made a comprehensive study of the timber resources as called for by the plan. It found that the timber resource was "damaged by fire, overharvest, neglect, and abuse," and that "an effort is needed to educate landowners to the need for management and improvement."

As a result, the Woodland Committee is helping landowners organize a timber development group to seek ways to raise the level of timber management in the area.

The RC&D association working with the state forestry division has brought about the establishment of forest fire protection in all 11 counties for the first time. An accelerated tree planting program is also making good progress.

An SCS plant materials subcenter has been established in cooperation with Tennessee Technological University to find and test new plants for problem soils common to the area.

To further accelerate conservation assistance to farmers, the Soil Conservation Service employed four additional soil conservationists and one soil scientist. All five men are paid by Federal RC&D funds.

SCS records show that the extra help has increased the rate of conservation farm planning by about 40 percent over preproject days. The 11-county average before the extra assistance was about 275 plans completed by landowners each year. In the past year, it was 395.

A. K. Booher, a native of the area with 15 years' experience as a soil conservationist in several locations, replaced Couch as project coordinator in 1967 when Couch accepted a graduate scholarship.

"It is increasingly difficult to tell what project measure helps which people," Booher says. "Development of nonfarm enterprises creates more opportunity for farm people. In fact many, if not most, people who are employed in our fast-developing industrial community are from farms."

One of the key goals of the RC&D association has been to stimulate industrial development. A number of industries have recently established plants in the area, and many local plants have expanded their operations. The Industrial and Mining Committee has worked to accelerate this development.

The committee organized an industrial development conference held at Cookeville in May 1966. The Small Business Administration, Economic Development Administration, Tennessee Industrial Development Commission, and regional chambers of commerce joined in sponsoring the conference and in presenting facts about the resources of the area favorable for industry. Representatives of 12 industries attended. It is planned to hold conferences every 2 years.

The committee is also working to employ a full-time industrial director for the project area. It is encouraging local communities to establish industrial parks. One such park has been completed at Gainesboro, and another is being installed at Livingston.

Now 10 of the 11 RC&D counties have new industries. Douglas Aircraft Company has five plants in

the area, employing about 1,000 people. The Fleetguard Division of Cummins Diesel Company has located a new plant at Cookeville.

Six of the RC&D counties were recently designated for a Concentrated Employment Program under the leadership of the U. S. Department of Labor and the Tennessee Department of Employment Security. Advisers included the Economic Development Administration, the Office of Economic Opportunity, the Department of Agriculture, county judges, mayors, chambers of commerce, and industrial leaders.

To date, three training centers have been established. The centers screen the unemployed for orientation and education. After screening, many are offered employment with industry or as workers in the Mainstream Program of the Office of Economic Opportunity. Others are enrolled in vocational trade schools or for training in one of the special handicrafts.

Cumberland mountain crafts have an appeal, but there has never been an effective way for the whittlers, chairmakers, weavers, and painters to market their handicraft.

The RC&D Association joined hands with the Economic Development Center at the Tennessee Technological University to sponsor the Upper Cumberland Crafts Association. The association already has nearly 400 members.

The Crafts Association borrowed \$60,000 from the Farmers Home Administration to build a warehouse and retail store. The new market is located at Crossville across the highway from the Cumberland County Playhouse, a phenomenally successful summer theater. Another retail store has just been opened in one of the large shopping centers in Nashville.

The RC&D plan is open-ended, and new project measures are being added as they are developed. The area's rich historical heritage prompted the directors to create a 12th committee to develop and re-

store historical sites in the area. The Historical Committee has found fertile ground in which to work.

Near the birthplace of World War I hero Sergeant Alvin T. York in Fentress County, Sergeant York's old water-powered grist mill is being restored to working condition with state funds in cooperation with the American Legion and other groups. Plans call for a museum to house personal effects of Sergeant York.

Moses Fisk, a noted educator, engineer, and pioneer from New England, established the first academy for women west of the Alleghenies. The Fisk home is being restored in Overton County.

Numerous other projects of historical significance have been launched. The committee felt that early pioneer cemeteries rightfully deserved attention, and many have been restored.

The county courts have made arrangements to place historical markers on all the courthouses.

W. R. Lassiter of DeKalb County, chairman of the Beautification Subcommittee, says that one of the

most effective results of project teamwork has been making the countryside more attractive.

Lack of organized garbage pick-up and disposal service, linked with miles of isolated roads, created a custom of roadside dumping that had built up unsavory garbage and abandoned cars and appliances on some of the most scenic drives in the area. Investors seeking industrial sites were repelled by the littered appearance of a basically beautiful countryside.

The first big beautification campaign was carried out in 1967. The 1968 campaign was even better.

Good organization made the effort work. A beautification committee representing the various communities and organizations was appointed in each county. Scout groups, garden clubs, civic clubs, and home demonstration clubs participated.

In some counties the electric co-ops gave free tow-away service to rid the roadsides of abandoned cars. Schoolyards were landscaped, and litter barrels were put up at key locations.



Native craftsmen find an outlet for their products through Cumberland Mountain Crafts Association.

About 120 acres of unsightly roadsides have been seeded. Seed and other materials are purchased with RC&D funds. Labor for site preparation, seeding, mulching, etc., is arranged for locally. In several counties people working under the OEO's Mainstream Program took part. More help came from state and county highway departments, Neighborhood Youth Corps, and various clubs and organizations.

Beautification is also a sanitation measure.

When the project was developed, there were no sanitary landfills in the Hull-York counties. Garbage mouldered in open dumps or roadsides. One of the objectives of the project plan is to establish sanitary landfills in all project counties.

Five towns, including Cookeville, either have landfills in operation now or have acquired property for them. The Soil Conservation Service has made soil examinations and given other technical help in site selection and construction.

Obie Massingale, Negro assistant to Ralph Sasser, SCS state conservationist in Tennessee, sees progress in the improvement of the quality of living for long-disadvantaged people. A notable example is the Free Hills Community, a predominantly Negro settlement of some 200 people in Clay County.

Workmen installing conduit to lead floodwaters safely through Livingston as part of watershed protection project.



The Free Hills Development Association was created within the framework of the home demonstration club and includes both men and women. The nine-member board of directors has five women and four men.

A Free Hills Development Plan—a “mini-RC&D” program—was prepared by the board with the participation of county officials, Tennessee State University, the SCS, Farmers Home Administration, and other agencies.

As a first step by the county government to help upgrade the community, a new road is being built. All roadcuts are being seeded and beautified as the work proceeds.

Beautification has been a prime objective of the Free Hills group. The community center, an old schoolhouse, has a new lawn. The cemetery has been cleaned up and landscaped with shrubbery. A workshop was held by Tennessee State A&I Extension and Field Service personnel to show residents how to select and transplant native plants for ornamentals.

The Cumberland Mountain Crafts Association helped the Free Hills Development Association get an Office of Economic Opportunity grant to start vocational classes in ironworking and broommaking. Tennessee State University is also starting classes in crafts.

The RC&D Recreation and Tourism Committee has promoted a recreation industry in the area with much success.

The committee gathered funds by private subscription to carry out a major campaign in 1967. About \$10,000 was used to publish informational leaflets, bumper stickers, and placemats depicting the attractions in the Hull-York country as Tennessee's Family Funland.

Some proprietors of recreation businesses say they felt a definite upswing in receipts after the publicity campaign got rolling. They point out that State records for the Hull-York counties show an 11 percent increase in sales tax re-

ceipts in 1967 over the previous year—an increase, they say, that can be largely attributed to the expanding recreation and tourism industry.

People who have recreational enterprises—hunting preserves, motels, pioneer attractions, and the like—have formed the Upper Cumberland Tourist Association.

Five new golf courses have been built. A sixth is under construction, another is being expanded with RC&D loans. Four trailer parks with a combined capacity for some 200 trailers have been established in addition to the large camping areas provided by two state parks and several U. S. Army Corps of Engineers camping grounds.

The Hull-York area is blessed with an abundance of rainfall totaling about 50 inches a year, yet droughts and critical water shortages are becoming more prevalent. Floods also frequently wreak havoc with life and property.

The community of Livingston suffered a crippling flood in 1962. Floodwaters covered machinery, raw materials, and finished goods in the town's only industry, a garment factory. Factory officials said that unless something was done the factory would be closed.

The RC&D directors agreed that a definite plan for water-resource development had to become a prominent part of the RC&D project. The Livingston flood-prevention project, designed by the Soil Conservation Service and financed through RC&D funds, was completed in the fall of 1967. The factory and jobs of some 1,400 employees are now secure from floods.

Other project measures for community improvement may not be quite as dramatic, but some may have just as enduring effect.

Town planners and industrial developers, for instance, will soon have detailed soil surveys to help them select suitable industrial sites, homesites, sanitary landfills, parks, and other community facilities. Acceleration of soil surveys in areas



H. C. Hardy of Tennessee A&I University helps Mrs. Bailey Andrews transplant a dogwood as demonstration in Free Hills Community.

of most intensive development is being carried out as a four-way cooperative program by the municipalities, Hull-York Lakeland Association, Soil Conservation Service, and the University of Tennessee.

The lack of community facilities to meet health and educational needs had always hampered the area's growth and development. Since the Hull-York Association was organized, five new libraries have been built with the help of Health, Education, and Welfare and Appalachia grants. Three new high schools, four health centers, and a mental health center are now under construction.

The drive, enthusiasm, and zeal of the Hull-York Lakeland RC&D Association and its people caused the Tennessee Conservation League to select the association as recipient of its 1967 “Conservation Organization Award.”

The project plan estimates that the project will increase net income in the area by \$57 million in the 10-year installation period, provided all proposed measures are completed. ♦

Resource conservation and development projects are successful, and they are popular.

Just 5 years ago the first 10 RC&D projects were authorized for planning assistance by the Secretary of Agriculture. Within a year they were operational. Four years later, there are 51 authorized projects in 39 states; 41 are operational.

These projects include all or parts of 293 counties—almost 10 percent of all counties in the United States—with an area of 169 million acres of land and water. Additional applications for planning assistance have been concurred in by the governors of 28 states, and more are coming.

The purpose of the projects is to provide additional economic opportunities to the people of their areas through accelerated conservation, development, and multiple use of natural resources. Their activities go beyond this, however, and are helping to bring about community and area improvements beyond the realm of the natural resources and environment.

There must be good reasons why RC&D projects are meeting with wide acceptance and are so successful.

Resource Conservation and Development . . .

Multicounty projects help people help themselves

By John W. Barnard

Resource Development Division, SCS, Washington, D. C.

The greatest single reason is that the projects originate with local people. The RC&D approach grew out of 30 years of experience of soil and water conservation districts that taught that successful conservation efforts must be locally directed.

Local leadership organizes for action, and the project is built from the bottom up rather than from the top down. Local people make decisions about their project and what they intend to do. They recognize the need of the multicounty approach and set the boundaries large enough to deal with areawide problems and small enough for effective local leadership.

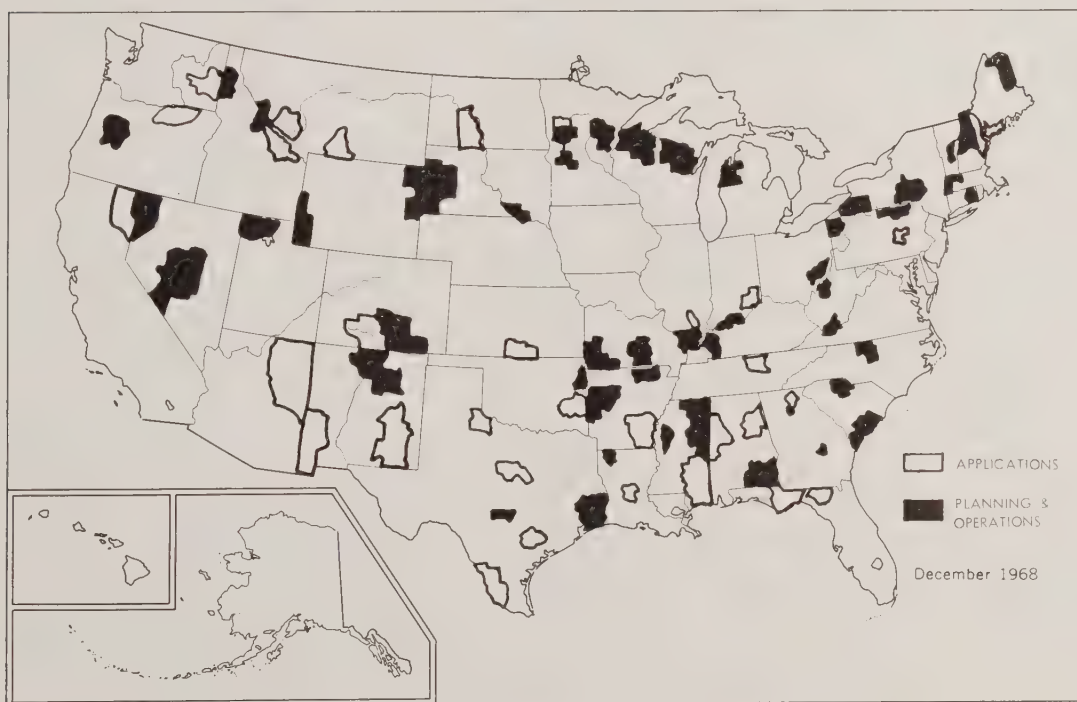
They investigate their problems,

state their proposals, and develop their plans. They secure the cooperation of their local governmental units as project sponsors.

Local leadership teams up with all federal, state, and local agencies that can help with meaningful actions for progress. All segments of the community—rural, urban, suburban—coordinate their activities to achieve project goals.

The projects do not depend entirely on federal or state agencies for funds, however.

For example, in the Bitter Root Project in Montana, of the first 36 project measures completed or nearly completed, only 14 used federal funds. Local people spent \$1.8 million or 74 percent of the total, to finance their share of improve-



Economic Benefits of Project Measures

	Measures (No.)	Employment in instal- lation (Man-yr.)	Annual employment after in- stallation (Man-yr.)	Increased gross annual income (Thous.)
Status as of July 1, 1968—				
Being planned	1,260	31,238	16,145	\$137,069
Being installed	837	29,181	24,771	213,423
Completed	755	13,087	11,103	122,336
Total	2,852	73,506	52,019	472,828

ments; federal, state, and county funds totaled \$633,000 or 26 percent. Of the governmental shares, 19 percent were federal, 6 percent state, and 1 percent county.

The table shows the benefits al-

ready experienced or expected from 2,852 project measures activated in 28 projects by July 1, 1968. They add up to more than 11,000 man-years of continuing employment and \$122 million increased annual

gross income created from completed measures associated with project action. And this is just the beginning.

The environment of effective community action, encouragement of private investment, and programs for improved community facilities all speed up efforts to bring about needed action. The carrying out of one measure often brings about the installation of related measures. In total, this means better living conditions for people and improved economic status for the area.

Steps in activating a resource conservation and development project

One of the questions most frequently asked about resource conservation and development projects is just what are the necessary steps to get a project going. They are: (1) application, (2) project plan development, and (3) operations.

1. Application for planning assistance

An RC&D project must be sponsored by local public bodies that have legal authority to undertake resource development activities. Usually eligible are soil and water conservation districts, county governing bodies, municipalities, towns, local and state agencies, irrigation districts, public development corporations, and similar groups.

Other local groups and organizations may endorse the project.

The sponsors draw up a project application outlining the resource problems and development opportunities as they see them. The Department of Agriculture and other agencies can help in preparing the application.

After approval by the Governor of the state, the application is forwarded through the Soil Conservation Service to USDA for review and consideration for authorization of planning assistance.

2. A project plan

After USDA authorization of the application for planning assistance, the project sponsors develop a project plan. The SCS state conservationist appoints a project coordinator to help the sponsors coordinate the assistance from the many state, federal, and local agencies that will be participating and to help the sponsors prepare a satisfactory plan.

Of course, not all the resources and needs can be adequately inventoried or described at the beginning. The initial plan usually presents in some detail measures of high priority that can be started within the next few years. Others that require further inventory and study are indicated in less detail or simply listed. The project plan is an open-end plan that might be amended or revised at anytime.

When the plan is completed, the sponsors submit it to the Governor or the designated state agency. After approval there, the SCS state conservationist sends it to the SCS administrator with review copies to other agencies concerned and to the House and Senate Subcommittees for Agriculture Appropriations.

3. Operations

The Secretary of Agriculture au-

thorizes USDA agencies to assist the sponsors in carrying out those phases of the plan for which each agency has authority.

A coordinated approach is essential in carrying forward project operations. Sponsors set priorities, arrange for cooperation of local agencies or groups, and establish major policies. They may appoint a steering or executive committee for screening requests and advising the local sponsoring groups.

Many activities or project measures are carried out entirely with local resources, and for these the sponsors may act as a clearing house, suggest ideas, and find sources of help. They encourage private investment at every opportunity for it.

Soil and water conservation districts have an important place in RC&D project operations because of their authority under state laws to carry out broad land use programs. Other state and local governmental units also have an important place, since they can act as contracting agencies, receive federal or other funds, and operate and maintain works of improvement.

Federal agencies accelerate ongoing programs to provide more employment and contribute to expansion of the local economy. ♦



At right, Johnny Howard watches the last cotton crop leave the land the league will soon use for recreation. Interagency cooperation is evident in this planning group for the Sunflower River Recreational League. Seated (from left) are Al Phonse, FHA; Johnny Howard, Indianola businessman and league president; Malcolm C. French, FHA, and R. J. Ross, SCS. Standing (from left) are Sylvester Roberts, Neighborhood Youth Corps; James R. Davis, County Extension Service; Clarence L. Hawkins, OEO; and C. H. Whittington, SCS.



Community converts plantation cropland to recreation use

A 126-acre patch of cotton in Mississippi will never be the same after the Sunflower River Recreational League completes its plans to convert it from Old South plantation land to New South recreation land.

After the final crop of cotton is picked this winter, the furrows smoothed, the dams built, and buildings erected, the league will have the first recreation development of its kind in the Mississippi Delta.

SCS helped plan the layout for a 33-acre lake, baseball field, golf course, softball field, tennis courts, barbecue pits, and picnic tables, plus a handsome brick clubhouse on cropland that was patented in 1855. And, the Farmers Home Administration financed the development with a \$220,000 loan, all under the Southeast Delta Resource Conservation and Development Project.

Most of the 250 league members are rural residents in Sunflower,

Humphreys, Washington, Bolivar, and Leflore counties. Many live on farms, but the rolls are peppered with doctors, teachers, skilled mechanics, and businessmen.

Johnny Howard, Indianola businessman and league president, said, "The members are really excited. I had three members from Greenville here recently. They told me, 'This is one of the best things we could have done' . . . applications for membership are coming in from St. Louis; Springfield, Ill.; Chicago . . . from people who used to live in the Delta. . . ."

Local officials and businessmen believe the recreation area will attract skilled labor and paying customers and are proud of the cooperative attitude and initiative the people have shown. State and federal agencies are also cooperating through the RC&D project composed of the Delta council, the Sunflower Soil Conservation District, and other local districts.

Sunflower County officials have already platted the area and plan to build an access road.

Undoubtedly, the road will be kept busy, since literally thousands of Delta citizens are keyed up with the excitement of having their own recreation area. ♦

Farmer coop business in the billions of dollars

The dollar business volume of farmer cooperatives exceeded \$16.5 billion in fiscal year 1967, an increase of 6 percent over the previous year. This is a rise of 59 percent over the volume 10 years earlier, according to the annual survey made by the USDA Farmer Cooperative Service.

The survey showed total net business volume of \$16.6 billion for marketing, purchasing, and related-service cooperatives for fiscal 1967. California, Minnesota, and Iowa were first, second, and third among the states in total net dollar volume of business. ♦

Fish farming, a new venture

A "new" type of farming is gaining in popularity. It combines the best aspects of sound land use and economic opportunities with production of a delicious foodstuff. And it also affords fine recreational and sporting experiences for city-folk.

This type of farming is called fish farming. It is "new" only in the sense that many farmers and other persons are just beginning to get into the business. ♦



Three future mechanics learn their trade from Instructor Jess Johnson (left).

Training program mans RC&D jobs

Training programs that equip people with new skills for better income are a feature of the Cherokee Hills RC&D Project in eastern Oklahoma.

One of the schools, supported by the Cherokee Indian Tribe and the U. S. Bureau of Indian Affairs, is opening new job opportunities especially for Indian citizens of the area.

In May 1968, 155 unemployed or underemployed men and women were enrolled in seven different training courses funded by the Department of Labor and sponsored by the RC&D Executive Committee and Council.

High placement rate

A high percentage of the graduates have found employment. Out of 55 workers graduated from four schools, 41 are now employed, most of them in the Tahlequah area. The Indian-operated Bull Hollow

Dozer Operator School placed 11 of its first 13 graduates, and one went on to college.

Many jobs are created within commuting distance by other RC&D project measures, such as the Arkansas River Navigation Project, poultry developments, industrial expansion, and related measures.

New taxpayers

The RC&D sponsors adopted the training program as a means of implementing one of their 21 objectives for broad community development. In the three-county area the educational and income levels of citizens were low. Among people more than 25 years old, the average schooling completed was 8.4 years. In 1960, about 62 percent of the families in the area had median incomes less than \$3,000.

The RC&D project measure was planned to train 800 people during

a 3-year period. The first year's program offered men and women 22 to 55 years old training in welding, machine tool operation, bulldozer operation, stenography, farm maintenance, small motor repair, and tractor and implement repair. The courses have already taken unemployed people off the welfare rolls and turned them into taxpayers at wage rates higher than they had ever received.

The second phase of the program has been funded for 1969, for additional courses in stenography, welder combination, tractor and implement repair, bulldozer operation, machine tool operation, and small engine repair.

The Departments of Agriculture and Labor coordinated efforts at the Washington level to put priority funding into the training courses, with other types of assistance from the Department of the Interior and Department of Health, Education, and Welfare. The Oklahoma Cooperative Area Manpower Planning System (CAMPS), through the leadership

Trainee, Roy Proctor, gains a new start for himself and his family as a bulldozer operator.



of the Oklahoma State Employment Service, also helped in developing the program.

Cherokee Tribe's school

The Cherokee Indian Tribe of Oklahoma sponsored four courses in heavy equipment operations at Bull Hollow, starting in September 1966. The tribe provided the school site, buildings, and heavy equip-

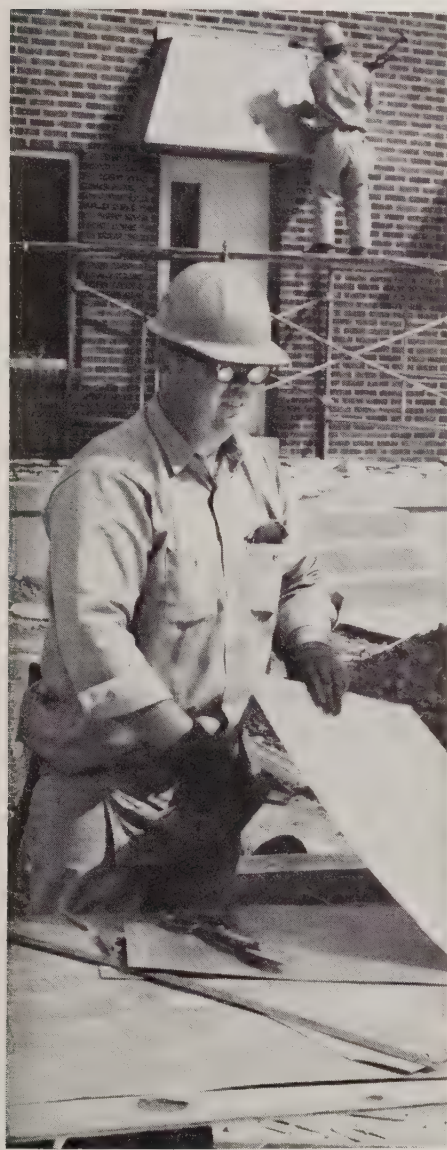
ment maintenance. The Bureau of Indian Affairs and the Cherokee Soil Conservation Committee provided the heavy equipment. Sixty-five percent of the first group trained were Cherokee Indians.

The trainees receive allowances through the Employment Service. Teachers' salaries are administered by Vocational-Technical Education, Manpower Development and

Training Administration. Local technical action panels and the Employment Service recruit the trainees.

All trainees receive certificates upon completion of each course, and in addition the Cherokee Tribe presents its own certificate to graduating Cherokee Indians.—ALLEN R. MOSS, *RC&D project coordinator, SCS, Tahlequah, Okla.* ♦

Water control spurs community development



A 60-unit housing development is almost ready to fill a basic need for the growing city.

The city of Providence in western Kentucky has ended its long history of water problems in exchange for a handsome bundle of community developments through the Tradewater River Area RC&D Project.

Since the six-county project was authorized for operations in 1966, Providence has used RC&D help to install these improvements:

(1) Channel improvements on Providence Creek that will eliminate threats of flooding and sediment damage to the center of the city.

(2) A renovated water plant that will purify 1 million gallons of water a day.

(3) A new sewage treatment plant capable of treating 1 million gallons of sewage a day.

(4) A 39-acre industrial reserve seeded to provide an attractive site for future industry.

(5) A 60-unit, \$977,000 housing development financed by the Public Housing Administration.

(6) A 16-acre recreational site now including a little league baseball field with a picnic shelter.

(7) Initiation of regular town forum meetings at which about 75 local leaders meet quarterly to consider accomplishments and discuss the city's future.

(8) A request to the Soil Conservation Service from the city's planning commission for soil surveys on

the 5,500 acres within the city limits.

"These surveys will aid our planning and zoning commission, engineers, realtors, contractors, and others to make wise use of land in and around our city," said Mac Lawrence Book, Providence's first city manager.

All of these improvements center around Owens Creek, a direct tributary of Tradewater River. Providence lies in the path of the creek and two tributaries in a 3,700-acre drainage area. Channel improvements that help control floodwaters, high water table, sedimentation, and mosquitoes along Owens Creek also improve conditions for industrial, recreational, and residential developments in Providence.

Improvements to the creek will cost an estimated \$129,000. The city pays one-third and is responsible for land easements, rights-of-way, and maintenance after installation.

When all improvements are completed, Owens Creek will be an unobstructed open drainage channel to Tradewater River from the water and sewage treatment plants, the fairgrounds, and the main bridge in the city. Two dams will hold back sediment and add to the flood-protection benefits. The estimated average annual flood damage will be reduced by \$2,720 or 96 percent.—WILLIAM C. LOWRY, *RC&D project coordinator, Madisonville, Ky.* ♦

Summary of activities of the Soil Conservation Service for fiscal year 1968

Service to rural and urban communities

The year 1968 found the Soil Conservation Service more deeply involved than ever in service to rural and urban communities in their efforts to create a better environment for human life.

SCS put a larger portion of its manpower into such community and group services as—

(1) Providing basic data on land and water resources to local authorities engaged in land use planning, resource development, and economic improvement.

(2) Providing consultive services to public bodies, private organizations, and individual property owners on soil and water conservation problems of community or regional scope and in suburban and urbanizing areas.

(3) Assisting local sponsors of resource conservation and development projects and small watershed projects prepare comprehensive plans for conservation, development, and use of land and water resources.

(4) Assisting public bodies and private landowners modify land-treatment measures to reduce the hazards of water and air pollution, improve methods of waste disposal, and enhance the esthetic and recreational values of the landscape.

Although SCS field men and staff specialists devoted more of their time to these activities in fiscal 1968 than in 1967, they continued to service ongoing programs of assistance to rural landowners in conservation

Assistance to communities and projects Amounts for fiscal year 1968 compared to 1967		
Consultive services	184,672	Up 46%
Basic data provided for comprehensive plans, acres	137,443,058	Up 38%
Properties adequately treated, acres	456,795	Up 255%
Land use regulations established by local governments, acres	14,392,170	Up 730%
RC&D projects in operation	28	Up 34%
RC&D project measures activated	2,852	Up 52%
Watershed projects in operation	834	Up 2%
Watershed projects completed	205	Up 29%

districts with only slight decreases in results.

While community services and accomplishments generally increased in the range of 30 to 700 percent over 1967 levels, services to individuals were reduced less than 10 percent, and the acreage of land adequately treated continued to increase (see table).

The conservation mission

Following upon the recent intensive study by conservation districts of their expanding role in resource conservation, and the statement by the Department of Agriculture of its policies for Resources in Action (*Soil Conservation*, February 1968), SCS further analyzed and defined its conservation mission.

The central goal of SCS and other USDA resource programs is to assure that the Nation's natural resources are kept in a condition of readiness to support the economic system and social culture desired by society. The objective is human welfare and the dignity of man's spirit; our concern is with the total

relationship between man and the environment around him.

Maintaining natural resource conditions that will support an adequate and profitable agriculture is only one of the aims of soil and water conservation. Other major results are—

- Assuring the continuing availability of land and water to satisfy all human needs.
- Greater economic activity in rural areas, thereby stemming the migration of people to urban centers.
- Upgrading of water quality by reduction of sediments and other pollutants.
- Reduction of air pollution from wind erosion and smoke.
- Control of streamflow by improvement of infiltration of water into and through the soil profile, thereby providing lower flows in the peak season and higher flows in the dry season.
- Improvement of the physical environment and economic well-being by decreasing the ill effects of uncontrolled flooding.

- Larger and more diverse populations of fish and wildlife through habitat preservation and development.
- Creating and preserving natural beauty by providing for harmonious land use patterns and blending economic uses into the natural landscape.
- Greater recreation opportunities from agricultural areas and from the lands and waters that crop, pasture, rangeland, and woodland conservation systems enhance.

ering 137½ million acres, an increase of about 38 percent over the preceding year.

About 5,600 properties occupying about ½ million acres were adequately treated, and 273 units of local government adopted land use regulations or treatment standards making use of such information.

Nearly twice as many land owners and operators were assisted on group conservation activities in 1968 as in 1967. SCS made preliminary investigations and reports on 4,374 proposed group enterprises

pected to provide continued employment of more than 50,000 man-years annually when all project measures are completed.

The 750 measures that had been completed by July 1, 1968, provide 11,000 man-years of continuing employment and have increased annual gross income of the project areas by more than \$120 million.

By the end of the year 2,852 planned land, water, and related development measures had been activated. When all these are completed, they will increase output of goods and services an estimated \$470 million annually.

Some 200 SCS professional and technical people helping to accelerate activities in RC&D projects were engaged in fulltime, day-to-day resource development in 1968. An additional 726 agency personnel participating in project activities were paid from various state and federal funds.

Sponsors of RC&D projects are legal public bodies and as such represent local people in all phases of resource and economic planning and development. Since RC&D sponsors' programs are broad and resource based, they help improve living conditions and provide a favorable environment for industry and other business enterprises.

Assistance to individual land owners and users

Amounts for fiscal year 1968 compared to 1967

New district cooperators	101,870	Down	6%
Total landowners assisted	1,145,782	Down	2%
Services provided	3,269,329	Down	2%
New conservation plans	82,847	Down	11%
New conservation plans, acres	31,959,151	Down	6%
Owners applying practices	747,396	Down	3%
Land adequately treated, acres	52,012,875	Up	10%

Soil surveys

Mapping, acres	52,190,793	Up	3%
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Preserving and strengthening the productive capacity of the resource base through time and creating resource conditions that upgrade man's environment are dual and compatible conservation goals that support the Nation's economic system and its social culture.

Community and consultive services

The awakening concern among citizens and community leaders about the total environment has multiplied demands on the Soil Conservation Service for information about land and water resources for nonagricultural uses and in broad geographic areas for planning purposes.

In fiscal 1968, SCS responded to about 1½ times as many such requests as in the preceding year. SCS conservationists provided 185,000 consultive services to some 108,000 individuals and groups, such as rural nonfarm residents, zoning commissions, contractors, civic organizations, and the like.

SCS provided basic data for use in 2,309 comprehensive plans cov-

comprising more than 4½ million acres and helped prepare 3,900 group plans on 2¼ million acres. These services exceeded the 1967 level by roughly 20 percent. They benefited 38,466 land owners or users, about twice as many as were members of participating groups in 1967.

RC&D projects

Resource conservation and development projects are proving to be an effective means of regional resource planning and accelerated economic development under local leadership.

By July 1, 1968, 41 projects covering 112,689,386 acres were underway in 35 states. Twenty-eight of these projects were operational, and 13 were developing plans for action. Individual projects include from one to more than 20 counties and range in size from about 280,000 to more than 8 million acres.

The first 28 operational projects will result in about 73,000 additional man-years of employment during construction and are ex-

Assistance to low-income farmers

The Soil Conservation Service increased by 14 percent the number of man-hours devoted to working with small farmers (those usually grossing \$10,000 or less annually) in fiscal 1968. The number of small farmers assisted was 21 percent more than in 1967.

Service to rural residents (primarily those living on small non-farm tracts) increased 48 percent, and the number assisted in 1968 rose to more than 64,000.

Great Plains Conservation Program

The Great Plains Conservation Program is helping to bring about sorely needed stabilization of soil

Summary of Progress, Fiscal Year 1968

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Progress items	Total reportable progress	Cumulative to June 30, 1968	Progress items	Total reportable progress	Cumulative to June 30, 1968
Individual Conservation Plans and Related Services			Great Plains Conservation Program		
District cooperatorsNo.	101,870	2,161,710	Applications receivedNo.	3,948	36,141
District cooperatorsacres	36,121,334	726,984,415	Applications receivedacres	6,786,186	68,959,532
Cooperators canceledNo.	59,824	—	Contracts signedNo.	3,227	31,122
Cooperators canceledacres	19,244,318	—	Contracts signedacres	5,176,284	56,601,700
Landowners assistedNo.	1,145,782	—	Contract modificationsNo.	14,985	114,050
Services providedNo.	3,269,329	—	Contracts terminated:		
Owners applying practices.....No.	747,396	—	By mutual consent.....No.	173	810
Special mapping for cons. plan & CNIacres	2,013,463	230,630,730	By mutual consent.....acres	162,806	1,272,838
Conservation plans prepared:			For causeNo.	97	671
FarmNo.	74,151	1,594,574	For causeacres	45,668	521,148
RanchNo.	3,077	63,666	By expirationNo.	2,553	10,909
OtherNo.	5,619	35,916	By expirationacres	4,355,536	17,358,545
(Total conservation plans)	(82,847)	(1,694,156)	(Total terminations, No.)	(2,823)	(12,390)
Farmacres	16,857,347	335,818,563	(Total terminations, acres)	(4,564,010)	(19,152,531)
Ranchacres	14,370,818	211,517,905	Cropland before GP contract, acres	769,976	8,675,677
Otheracres	730,986	5,661,938	Planned cropland conversion, acres	135,975	1,814,041
(Total conservation plans, acres)	(31,959,151)	(552,998,406)			
Conservation plans canceled:			Servicing Other USDA Programs		
FarmNo.	43,180	—	Referrals serviced:		
RanchNo.	1,805	—	ACP—F.Y. 1968No.	329,700	—
OtherNo.	741	—	ACP—Program Yr. 1967.....No.	—	326,786
(Total plans canceled)	(45,726)	—	Cropland Adjustment Program.No.	308	—
Farmacres	8,776,093	—	Cropland Conversion Program.No.	36	—
Ranchacres	5,291,616	—	Appalachian Land Stabilization and Conservation Program...No.	1,189	—
Otheracres	37,839	—	Conservation plans approved...No.	970	—
(Total plans canceled, acres)	(14,105,548)	—			
Conservation plans revised:			Soil Surveys		
FarmNo.	34,512	—	Soil surveys:		
RanchNo.	2,602	—	High intensityacres	2,480,341	32,540,974
OtherNo.	286	—	Medium intensityacres	36,994,793	576,042,470
(Total plans revised)	(37,400)	—	Low intensityacres	8,412,118	103,342,076
Farmacres	9,941,491	—	Reconnaissanceacres	4,303,541	19,100,099
Ranchacres	11,047,444	—	(Total)	(52,190,793)	(731,025,619)
Otheracres	209,616	—	Soil conservation surveys.....acres	—	29,626,745
(Total plans revised, acres)	(21,198,551)	—	Soil conservation surveys canceled or convertedacres	2,134,666	—
Federal lands in coordinated ranch plansNo.	98	580			
Federal plans in coordinated ranch plansacres	2,089,112	7,396,291			
Consultive Services			Snow Surveys and Water-Supply Forecasting		
Services providedNo.	184,672	—	Snow course measurements....No.	5,604	—
RecipientsNo.	107,824	—	Aerial snow marker readings...No.	950	—
Basic data for use in comprehensive plansNo.	2,309	—	Mountain precipitation gage readingsNo.	1,470	—
Basic data for use in comprehensive plansacres	137,443,058	—	Soil moisture station readings..No.	1,424	—
Land uses established by local governmentNo.	273	—	River stations for which numerical forecasts issuedNo.	426	—
Land uses established by local governmentacres	14,392,170	—	Numerical forecasts issued....No.	2,162	—
Properties treatedNo.	5,603	—			
Properties treatedacres	456,795	—	Recreation Developments		
Operating Units			Land owners and operators establishing first commercial recreation enterprise.....No.	2,412	47,087
Total operating units.....No.	17,521	4,597,111	Land owners and operators expanding commercial recreation enterprisesNo.	763	—
Total operating unitsacres	5,777,291	1,381,818,397	Land owners and operators with recreation as primary source of income.....No.	199	8,049
Other unitsNo.	13,454	1,301,864	Land owners and operators with recreation as primary source of income.....acres	52,786	—
Group Conservation Plans and Services			Private noncommercial facilities established or expanded.....No.	37,766	401,647
Group investigationsNo.	4,374	45,645	Public recreation facilities established or expanded.....No.	766	25,759
Group investigations.....acres	4,477,102	38,256,446			
Group plans prepared.....No.	3,901	44,869			
Group plans prepared.....acres	2,241,340	29,295,786			
Land owners or users in groupsNo.	38,466	324,725			
Services provided on jobs.....No.	73,273	—			

Summary of Progress, Fiscal Year 1968—Continued

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Progress items	Total reportable progress	On the land June 30, 1968	Progress items	Total reportable progress	On the land June 30, 1968
Conservation Practices Applied			Conservation Practices Applied—Continued		
Beddingacres	16,827	509,911	Woodland natural seeding.....acres	96,178	3,347,314
Brush and weed control.....acres	4,224,293	37,664,155	Obstruction removalacres	38,942	764,162
Irrigation canal or lateral....miles	306	38,994	Pasture and hayland managementacres	10,222,627	42,627,391
Cattle walkwayfeet	22,222	1,411,737	Pasture and hayland renovationacres	1,387,921	20,338,191
Chiseling and subsoiling.....acres	807,007	4,580,069	Pasture and hayland planting .acres	2,031,892	49,255,715
Clearing and snagging.....miles	641	3,979	Pipelinesmiles	2,040	20,495
Conservation cropping systemacres	23,493,803	175,468,335	Pittingacres	39,862	223,779
Contour farmingacres	4,025,983	44,448,934	Plow plantingacres	71,959	1,477,332
Contour furrowingacres	43,432	768,578	Pond sealing or lining.....No.	896	10,802
Contouring orchard, etc.....acres	10,730	208,143	Range proper use.....acres	74,114,965	205,709,220
Controlled burningacres	310,821	3,908,103	Woodland proper grazing....acres	1,953,487	11,046,647
Cover and green manure cropacres	3,331,072	27,351,810	Pumped well drain.....No.	2	143
Critical area planting.....acres	113,016	1,904,496	Pumping plant for water controlNo.	2,104	49,165
Crop residue use.....acres	18,110,252	127,863,768	Range renovationacres	12,335	1,525,691
Cutback bordermiles	142	1,770	Range seeding on converted landacres	152,299	4,800,262
Dam, diversionNo.	644	22,365	Range seedingacres	355,193	8,830,088
Dam, multiple-purposeNo.	366	4,718	(Total range seeding acres)	(507,492)	(13,630,350)
Debris basinNo.	1,982	82,654	Irrigation pit or regulating reservoirNo.	1,390	43,647
Range deferred grazing.....acres	14,631,450	53,061,445	Regulating water in drainage systemsacres	11,038	486,172
Desilting areaacres	453	4,379	Rock barrierfeet	15,826	276,528
Dikes and leveesmiles	257	9,455	Range rotation—deferred grazingacres	3,244,409	12,048,277
Irrigation ditch and canal liningmiles	1,475	23,669	Row arrangementacres	765,689	2,910,503
Ditchbank seedingmiles	1,069	22,395	Recreation access road.....miles	817	9,075
Diversionsmiles	2,819	95,985	Recreation area stabilization.....acres	3,752	96,679
Dune stabilizationacres	3,720	88,518	Recreation area planting.....acres	19,976	237,304
Emergency tillageacres	219,097	3,479,417	Recreation area pruning and thinningacres	6,911	71,789
Farm pondNo.	51,853	1,626,142	Recreation land grading and shapingacres	13,263	127,398
Farmstead and feedlot windbreakacres	28,893	630,309	Recreation trail and walkway .miles	407	3,908
Field border planting.....miles	1,499	42,481	Spoilbank spreadingmiles	5,206	128,153
Irrigation field ditch.....miles	2,328	126,138	Spring developmentNo.	5,172	103,765
Field windbreakmiles	3,921	86,498	Stock trailmiles	187	3,231
Firebreakmiles	8,455	122,988	Streambank protectionmiles	431	6,159
Fish and crop rotation.....acres	2,714	12,800	Stream channel improvement .miles	1,322	13,327
Fishpond stockingNo.	43,182	869,791	Stream channel stabilization .miles	22	623
Fishpond managementNo.	36,441	231,470	Stripcropping contouracres	146,666	5,794,240
Floodwater diversionfeet	63,249	1,160,879	Stripcropping, fieldacres	82,357	1,629,849
Floodwater-retarding structure .No.	513	9,562	Stripcropping, windacres	355,576	14,322,478
Floodwaymiles	41	586	(Total stripcropping, acres)	(584,599)	(21,746,567)
Grade stabilization structure...No.	14,066	216,143	Structure for water control.....No.	88,900	1,820,344
Grasses and legumes in rotationacres	1,467,660	23,859,984	Stubble mulchingacres	4,280,374	20,030,920
Grassed waterway or outlet....acres	102,117	1,718,658	Drainage field ditch.....miles	6,367	166,374
Hedgerow plantingmiles	305	27,943	Terrace, basinmiles	65	2,581
Hillside ditchmiles	254	5,520	Terrace, gradientmiles	12,937	780,741
Irrigation pipelinemiles	4,246	63,939	Terrace, levelmiles	10,723	374,782
Irrigation storage reservoir....No.	773	40,598	Terrace, parallelmiles	7,081	55,682
Irrigation system, sprinkler...No.	4,468	109,519	(Total terraces, miles)	(30,806)	(1,213,786)
Irrigation system, surface and subsurfaceNo.	4,568	121,686	Tile drainmiles	24,351	721,224
Irrigation system, tailwater recoveryNo.	1,131	9,383	Tile system structure.....No.	11,420	170,270
Irrigation water management..acres	3,726,754	15,729,579	Toxic salt reduction.....acres	86,401	1,215,849
Land clearingacres	638,948	14,052,226	Tree plantingacres	265,242	14,119,468
Drainage land gradingacres	34,876	309,340	Trough or tankNo.	13,385	359,032
Irrigation land levelingacres	459,952	10,170,405	Vegetative barriermiles	541	7,334
Land smoothingacres	319,350	5,570,709	Vertical drainNo.	57	1,710
Livestock exclusionacres	1,083,391	23,668,718	Waterspreadingacres	47,881	917,408
Minimum tillageacres	1,544,927	12,360,228	WellNo.	8,145	407,268
Drainage main or lateral....miles	6,701	305,687	Wildlife habitat preservation .acres	2,931,934	14,091,505
Mole drainmiles	10,837	56,185			
Mulchingacres	38,032	504,509			
Mulch plantingacres	53,425	204,857			

Summary of Progress, Fiscal Year 1968—Continued

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Progress items	Total reportable progress	On the land June 30, 1968	Progress items	Total reportable progress	On the land June 30, 1968
Conservation Practices Applied—Continued			Land Treated		
Wildlife wetland development	81,076	1,244,788	Land adequately treated.....	52,012,875	436,075,833
Wildlife habitat development	267,889	3,561,465			
Wildlife wetland preservation	259,354	2,632,267	Land Use Conversions ¹		
Wildlife watering facility.....	1,781	9,952	Cropland to grassland.....	1,243,178	17,905,047
Woodland direct seeding.....	12,596	509,819	Cropland to woodland.....	89,836	1,910,501
Woodland harvest cutting.....	839,463	17,838,393	Cropland to wildlife-recreation	75,298	932,540
Woodland intermediate cutting	823,557	15,595,714	Cropland to "other"	44,599	3,604,909
Woodland interplanting	21,218	915,094	All other uses to cropland	291,904	5,205,702
Woodland pruning	17,207	345,308	All other uses (except cropland) to wildlife-recreation.....	269,729	4,606,242
Woodland thinning	47,968	1,435,340			
Woodland underplanting	28,634	1,014,415			
Woodland weeding	327,774	10,542,554			

¹ Conversions on the land June 30, 1968, are estimates of conversions since July 1, 1962.

resources and of the local economy of the Plains states.

It is a program tailored to the peculiar conditions and needs of a geographic region. Authorized in 1956 and due to expire in 1971, it has brought 31,122 farm and ranch operators under contract with the Department of Agriculture to follow comprehensive conservation plans on 56,601,700 acres.

As the program nears the date of expiration, the demand for the long-term cost-sharing contracts continues to grow. The 1968 fiscal year ended with a backlog of more than 5,000 unserved applications. Three more states completed the designation of all eligible counties for participation in the program.

In fiscal 1968, 3,227 new contracts were signed covering 5,176,284 acres, obligating all the funds available for cost-sharing and technical assistance for the year.

A major effect of the program is to bring about the conversion to permanent vegetation of cropland unsuitable for sustained cultivation under the hazardous climatic conditions of the Plains. Contracts signed in 1968 call for such conversion of 135,975 acres, or about 18 percent, of the 769,976 acres of cropland on the farms and ranches

involved. To date, 1,814,041 acres of cropland conversion has been contracted under the program.

Quality of the environment

Efforts by the Soil Conservation Service to help improve the total environment are increasing in scope and intensity. Reducing sediment from all sources, encouraging proper land use and conservation practices to reduce duststorms, and controlling the effects of agricultural wastes as pollutants of air, water, and soil are first-priority objectives of all SCS programs.

During 1968, SCS conservationists and technical specialists helped explore alternatives for disposal of feedlot and poultry wastes, food and crop processing wastes, and domestic sewage, garbage, and refuse. The SCS soil, engineering, and plant science experts are involved in helping determine the use and limitations of lagoons, landfills, septic tanks, infiltration ditches, and spray systems for treatment of these wastes.

Eroding lands, both agricultural and urban, discharge sediment into the Nation's streams and rivers where it is one of the most damaging and offensive pollutants. Guidelines for minimizing possible soil

erosion from highway construction have been prepared jointly by the Soil Conservation Service and the U. S. Department of Transportation. These have been distributed to field personnel by the Soil Conservation Service and the Bureau of Public Roads as instructional material concerning highway planning and construction.

Outdoor recreation resources

Conservation measures, mostly on private land, used primarily for the development of outdoor recreation opportunities continued to be established at an accelerated pace with SCS assistance during fiscal year 1968.

Cropland converted to wildlife and recreation increased to 75,000 acres, about 12 percent over the preceding year. More than 3,700 acres of recreation area stabilization was reported in fiscal year 1968, an increase of 38 percent.

Other recreation practices showing an increase in 1968 included pruning and thinning, grading and shaping, establishing trails and walkways, and fishpond management. All these contributed directly to improving outdoor recreation opportunities, providing additional employment, and aiding the local

agricultural and business economy.

Altogether, more than 40,000 recreation developments were established during the year with SCS help.

Watershed protection

Local agencies and organizations submitted 123 applications for assistance on watershed-protection and flood-prevention projects under Public Law 566 during fiscal year 1968. Authorizations for planning assistance were limited to 100 as in previous years. At the end of the fiscal year, the backlog of unserved applications currently judged as suitable for planning authorizations stood at 781.

A total of 17 watershed projects were approved for operations and funded during the year. An additional 78 watershed work plans were approved by the appropriate committees of the Congress during the 90th session but funding was withheld.

Projects being planned continue to reflect the multiple-purpose concept for community development. Of the 78 plans approved by Congress, 49 incorporate more than one purpose. In addition to watershed protection and flood prevention, 23 projects will provide facilities for public recreation; 11 include water-supply storage; 18 improved agricultural drainage; 10 irrigation improvements; and four fish and wildlife enhancement.

Forty-six watershed projects were completed during fiscal 1968 and are producing a variety of benefits for local communities. A total of 205 projects in 47 states now have all land treatment and structures installed and are being operated and maintained by local organizations.

An impressive array of benefits were provided during fiscal 1968 to watershed residents where projects were under construction or completed. At least half of them are in low-income areas needing the kind of economic boost and environmental improvement that are part

of a successful watershed project. Estimates of some of the benefits produced during fiscal 1968 are:

\$27.5 million in flood damages prevented.

\$17.1 million added to local pay-rolls.

5,700 new jobs created.

Facilities for 1.2 million annual visitor days of recreation provided.

78,000 people in 11 communities achieved dependable water supplies.

River basin planning

SCS participated in water and related land-resource investigations on 51 river basins during fiscal 1968. Twenty-four of these are comprehensive inter-agency studies being coordinated by the Water Resources Council established under the Water Resources Planning Act of 1965.

The Soil Conservation Service provides leadership for river basin planning in the Department and provides the USDA member for each of the four river basin commissions created under provisions of Public Law 89-80. These commissions are charged with the preparation of a comprehensive joint plan for development of the water and related land resources of the commission areas. Other river basin studies in most cases are carried out in cooperation with State water-resource agencies.

Soil conservation districts

During 1968 the Soil Conservation Service continued its technical assistance to individual land owners and users cooperating with soil and water conservation districts throughout the country.

Conservation districts now encompass about 96 percent of the "land in farms" and 99 percent of the farms and ranches in the United States. Nineteen new districts were formed in 1968. Consolidations of existing districts left a net total of 3,012 districts with an

area of 1,798.5 million acres at the end of fiscal 1968.

The owners and operators of 114,342 farms, ranches, and other rural properties totaling more than 52 million acres developed new conservation plans or revised existing ones with Soil Conservation Service assistance. More than 747,000 land owners and operators were assisted in applying conservation to their land during approximately 1,146,000 contacts by Soil Conservation Service personnel. Adequate conservation treatment was applied to more than 52 million acres, or 10 percent more than in 1967.

Almost 6,000 conservation plans were developed or revised on about 940,000 acres of land primarily used for nonagricultural purposes, such as reservoir areas, recreational tracts, and industrial sites.

Among conservation practices applied by cooperators in amounts significantly greater than in 1967 were critical area planting by an increase of 19 percent, dune stabilization 116 percent, grassed waterways 18 percent, range renovation 63 percent, range rotation-deferred grazing 44 percent, recreation area stabilization 38 percent, water-spreading 72 percent, and wildlife habitat preservation 28 percent.

Soil surveys

Detailed soil surveys were completed in fiscal 1968 on 47.89 million acres and reconnaissance surveys on 4.30 million acres, making a total of slightly more than 52 million acres mapped during the year. Forty soil surveys covering 18.25 million acres were published. Adequate surveys now cover more than 731 million acres.

Soil surveys supplied basic soil information for developing technically sound conservation plans on about 83,000 farms and ranches. Of these 83,000, about 70 percent were small farms with gross income of \$10,000 or less.

About 5,200 organized groups received soil maps and interpretations from the Soil Conservation

Service in fiscal year 1968. About 1,540 of these used the information to plan for balanced rural-urban communities. Another 1,360 groups representing villages, towns, cities, counties, and multicounty areas used soil surveys to guide development in areas of rapid expansion of housing and industry, and some 2,300 rural groups used soil surveys for planning orderly rural development.

These resource data helped locate suitable sites for recreation, farming, forestry, ranching, and wildlife. They pinpointed stable soils for construction of homes, highways, and industry. We estimate that 3 to 5 million persons are affected by this work.

A new and more precise system of soil classification, initiated in 1951, was nearly completed for publication in fiscal 1968.

The new system provides more precise and useful soil surveys and makes it easier to use the results of soil research from all over the world that has specific application in the United States. The new system also helps provide more specific information to countries receiving technical assistance from the United States.

Conservation Needs Inventory

Updating of the nationwide Conservation Needs Inventory was in the final phase of completion at the end of the fiscal year. Acreage estimates of major land uses—cropland, pasture and range, forest, and other land—had been reviewed and accepted for 39 States by the Department Conservation Needs Inventory Committee. Estimated conservation treatment needs have been received from 22 States, of which four had been accepted and 18 were being reviewed.

All states have completed the watershed projects inventory, and machine summaries were completed for 43 States.

The Soil Conservation Service has contracted for the writing of a nontechnical report on the inven-

tory to be entitled "Status of Land and Water Resources in the United States—1967." The publication, which will be widely distributed, will contain the historical background of the inventory as well as tables of data for general use and application.

Requests for and use of preliminary data have been numerous and widespread. Tentative figures have been furnished to many planning bodies, economic study groups, RC&D project executive committees, and the like.

Technical advances

Rapid change in farming methods is bringing about equally great changes in conservation concepts and methods. The high-horsepower tractor with 6-, 8-, or 12-row equipment, the combine with 6- or 8-row corn header, and the multirow mechanical cotton picker are now commonplace.

Added emphasis was given in 1968 to installation of parallel terrace systems for erosion control on cropland, making farming easier with big equipment. Spacing to fit equipment used on each farm eliminates point rows that require extra turning.

There is a trend toward replacing surface waterways with buried pipe to carry runoff from terrace systems. This provides longer rows and reduces need for turning. Land grading, long accepted as necessary for surface-irrigated land, is being increasingly used on dry land.

A standardized system to simplify the presentation of detailed soil information for use in woodland conservation has been developed and adopted. It provides foresters and woodland owners a simplified tool for use with soil maps in woodland management, comparable to the capability classification that has served so well for broad area land-use planning and for tilled crop production. Provisions are being developed for the use of automatic data processing for the storage and retrieval of soil-woodland site data

from more than 20,000 sample plots.

Two pilot studies were started in 1968 to effect storage and retrieval of watershed data by computers. An increasing use of computer solutions is identifying a broader choice of effective and economical arrangements of measures for local planning groups to consider in formulating their watershed projects.

Four major ADP programs are now fully operating for doing (1) the watershed hydrology, (2) stream hydraulics, (3) the economic analyses, and (4) the positioning and sizing of structures, in all Public Law 566 watershed planning.

Work continues on standardization of detailed structural drawings. Added emphasis has been placed on standardization of design procedures for routine work that can be most efficiently performed by engineering aids.

Foreign program activities

The Soil Conservation Service continued to work with the Agency for International Development and the USDA's International Agricultural Development Service on overseas technical assistance programs. During the year 37 employees were working under long-term agreements and 18 people went on short-term assignments. SCS personnel worked in Brazil, Ecuador, India, Nigeria, Senegal, Thailand, Tunisia, Turkey, and Vietnam.

Negotiations have been completed for providing USDA technicians to Zambia.

During the year SCS provided assistance to 345 visiting technicians from 52 different countries. Two hundred and fifty-three were AID-sponsored and spent approximately 236 man-months in training with SCS. Thirty-four were sponsored by FAO and spent 19 man-months with the SCS. The others were sent by their governments, sponsored by private foundations, or organizations, or came on their own. ♦

NACD focuses on Nation's natural resources

The need to elevate popular concern for the Nation's natural resources in the coming decade will be the focus of the 23d annual convention of the National Association of Soil and Water Conservation Districts, February 2-6, Atlanta, Ga. More than 2,000 conservation district officials and other resource development leaders expect to attend the general sessions, committee meetings, tours, and other events.

Henry Caulfield, executive director of the Federal Water Resources Council, will talk about the First National Water Assessment just released. Edward P. Cliff, chief of the U. S. Forest Service, will discuss "Up-Grading America's Farm Forest Wealth." Glen E. Bennet, executive director of the Atlanta Region Metropolitan Planning Commission, will present "Key Resource Aspects of Regional Planning."

Other speakers at the convention will include Senator Herman E. Talmadge of Georgia and Mary Carter of the Girl Scouts of the U. S. A.

A Soil Stewardship inspirational meeting also will be held.

Irrigation association tackles national problem of water

The National Conference on Water Conservation With Sprinkler Irrigation, sponsored by the Sprinkler Irrigation Association, will tackle the critical national problem of water—its misuse, abuse, overuse, and sometimes appalling shortage.

The conference will be held on February 24 and 25 in Washington, D. C.

Floyd E. Dominy, commissioner of the U. S. Bureau of Reclamation,

will deliver the keynote address.

The Sprinkler Irrigation Association is a national trade organization whose members include manufacturers and distributors of agricultural and turf sprinkler irrigation equipment, conservationists, educators, and government personnel interested in more efficient use of water through sprinkler irrigation.

Range society zeroes in on north of the "forty-ninth"

"Rangelands North of the Forty-Ninth" is the theme for the 22d annual meeting of the American Society of Range Management, February 10-13, Calgary, Canada. The society has many active members in Canada with the Northwest, International Mountain, and Northern Plains sections straddling the border.

The program includes sessions on rangeland history, ecology, hydrology, management, improvement, marketing, and wildlife.

Dates and Places

February 2-6, National Association of Soil and Water Conservation Districts, Atlanta, Ga.

10-13, American Society of Range Management, Calgary, Canada

14-18, American Road Builders Association, Chicago, Ill.

15-19, American Association of School Administrators, Atlantic City, N. J.

16-19, American Pulpwood Association, New York, N. Y.

24-25, National Conference on Water Conservation With Sprinkler Irrigation, sponsored by the Sprinkler Irrigation Association, Washington, D. C.

24-26, Land Improvement Contractors of America, Grand Rapids, Mich.

28-March 2, National Wildlife Federation, Washington, D. C.

March

2-3, The Wildlife Society, Washington, D. C.

3-5, North American Wildlife and Natural Resources Conference, Washington, D. C.

14-20, Associated General Contractors, Washington, D. C.

16-19, National Farmers Union, Hot Springs National Park, Arkansas

16-20, Association for Supervision and Curriculum Development, Chicago, Ill.

20-26, National Lawn and Garden Week

21-25, National Science Teachers Association, Dallas, Tex.

29-30, National Conference on Rural Health, Seattle, Wash.

Review



From Sea to Shining Sea. BY THE PRESIDENT'S COUNCIL ON RECREATION AND NATURAL BEAUTY. 1968. (Government Printing Office) 304 pp., illus. \$2.50.

From Sea to Shining Sea is an outstandingly illustrated 304-page report by a Cabinet-level council on the American environment, both natural and manmade. It outlines progress since the 1965 White House Conference on Natural Beauty, describes the current state of each of our environments, gives a wealth of specific details about them, and makes general recommendation for improvements.

A look at the chapter headings illustrates its scope: the urban areas of downtown, the neighborhood, the city, and the metropolitan region; the rural areas of the countryside, the waterways, and wilderness and recreation areas; and highways and other forms of transportation. It also details the sectors of American life responsible for action, and gives a rather comprehensive listing of governmental and private organizations, plus information on pertinent printed and visual material.

The emphasis and style of the report may not please everyone, but on balance it seems a fair summary of those aspects of today's America it deals with.

To this reviewer, there seems a rather heavy stress on the urban environment. For that very reason, however, the book is especially good reading for people who already know the rural environment in some detail. For urban people I would recommend a further look at, say, the 1963 USDA yearbook *A Place to Live*.

To some conservationists *From Sea to Shining Sea* may seem to contain an almost undue stress on environmental beauty. However,

that is what the book is about and, as the book itself says: "It is almost as if Americans, confronted with the staggering consequences of nature out of balance, have fallen back on the one faculty that can somehow judge it and respond: the esthetic sense. If something is beautiful it is likely to be functioning properly and in good health. The ability to perceive beauty may, in the long run, prove man's salvation."—C. JOHNSTON, *Information Division, SCS, Washington, D.C.*

Science for Better Living: The Yearbook of Agriculture 1968. USDA. 386 pp., illus. \$3.00.

The fourth in USDA's new series of popularized yearbooks, begun in 1965 with *Consumers All*, is designed to acquaint the general public with the many ways agricultural research makes life better for the average citizen.

The book consists of 83 brief articles about specific research projects, or groups of related activities, and their applications to practical living.

The yearbook's preface points out that all of us benefit in our daily lives from agricultural research "because it improves the meals we eat, the clothes we wear, our water and air, the wood we build much of our homes with, and the plants and trees that make our surroundings more livable."

It is an attractive book, with handsome color and black-and-white photo illustrations, that should capture the interest of the general reader.

Unlike some of the yearbooks of the past, however, it will be of little use to the scientist and technologist as a working tool.—B.O.

New publications

Working with the Disadvantaged. By E. J. Niederfrank. 1968. USDA PA-891. 11 pp. "Effort to help disadvantaged people improve their situations generally must concentrate on personal development. First it must increase their confidence in you and your purposes. Simply

providing information about agency programs and other aids is not enough.

"Most of all, those who would assist must understand and appreciate what life is like at the bottom of society. Generally there is a real communication gap between the providers of aid and the people with the problems. And usually this gap results from the great differences in life styles of disadvantaged families compared with the life styles of other people."

This publication is aimed at helping professional workers overcome this gap.

Teaching Conservation Through Outdoor Education Areas. 1968. USDA PA-837. 23 pp., illus. \$0.20. Since most attitudes and behavioral patterns are formed early in youth, it is important that conservation learning take its place along with other learning processes, and it should begin in the elementary and secondary schools. Here is the Forest Service guide for the development and use of outdoor education areas.

Farmers' Pesticide Expenditures for Crops, Livestock, and Other Selected Uses in 1964. BY JOHN F. GALE, PAUL ANDRILENAS, AND AUSTIN FOX. 1968. USDA Agr. Econ. Rpt. 145. 20 pp., illus.

Farmers' Expenditures for Custom Pesticide Service in 1964. BY ROBERT JENKINS, THEODORE EICHERS, PAUL ANDRILENAS, AND AUSTIN FOX. 1968. USDA Agr. Econ. Rpt. 146. 24 pp., illus.

Extent of Farm Pesticide Use on Crops in 1966. BY AUSTIN FOX, THEODORE EICHERS, PAUL ANDRILENAS, ROBERT JENKINS, AND HELEN BLAKE. 1968. USDA Agr. Econ. Rpt. 147. 23 pp., illus. More than half of all United States farmers use weed, insect, or disease control chemicals on their crops. These booklets give basic data about pesticide use.

USDA opens new food stamp areas

Under USDA's Food Stamp Program, around 280,000 low-income people in 235 new areas in 31 states will be able to increase their food-buying power with food stamps.

When these new areas are in operation, well over 3 million people will be benefiting from food stamps in some 1,550 areas in 43 states and the District of Columbia. At the same time, another 3.5 million needy people will be getting USDA donated foods in counties and communities taking part in the Commodity Distribution Program. ♦

KAB uses cartoons in anti-litter campaign

Keep America Beautiful, Inc., in its war on litter, is distributing to newspapers, magazines, and other media throughout the country eight anti-litter conservation cartoons.

These cartoons were drawn by SCS Illustrator Felix Summers, and copies can be obtained from Keep America Beautiful, Inc., 99 Park Avenue, New York, N. Y. 10016.

SCS promotes this campaign against litter in many ways. It gives technical help to local communities for properly locating sanitary landfills for trash disposal. It has made litter control and cleanup a part of the project measures in more than 50 multicounty RC&D projects. And it has given technical help at hundreds of locations for conservation beautification.

In helping in conservation education programs in schools and in the development of school sites as outdoor learning laboratories, SCS stresses litter control. Initial cleanup of the outdoor sites is emphasized, and the school children are encouraged to take part in the project. ♦



FELLOW TRAVELER

From the Administrator:

RC&D—the can-do projects

Resource conservation and development projects have opened up new horizons for civic leaders in rural communities and for governing bodies of soil and water conservation districts.

They have extended areas of concern beyond the immediate limits of town, city, county, or district to regions of interrelated activities and resources.

The RC&D project "community" has proved consistently to be multicounty in scope.

When local people inventory and analyze their resources and needs, they see that accomplishments in one locality help adjoining localities do the same thing.

Consequently, the RC&D project area joins neighboring counties, districts, cities, and towns into a team seeking to advance the well-being of people within their total geographic area.

RC&D projects also have led soil conservation districts to direct major efforts to meeting the economic and social needs of people as they are related to the use and management of physical resources.

From their initial concern with soil erosion and water runoff on farmland, conservation districts have broadened their outlook to sponsor measures dealing with air and water pollution, water supply and management, solid waste disposal, recreation resource development, and related activities. These lead naturally to concern with communications and transportation, employment and markets, health and education, and the whole range of economic and social measures needed for effective use and development of area resources.

Begun 5 years ago in selected areas of the country, the program has grown to include 51 authorized projects. The RC&D idea has proved itself to be practical, popular, and successful. It is a going national program, with some 30 applications for new projects awaiting action and others in the process of preparation.

Many states are moving to establish a system of multi-jurisdictional planning and development

districts. They will provide areas within which the coordination of the planning and development activities of local, state, and federal agencies can be facilitated.

The RC&D approach to dealing with the natural resource base would support the comprehensive planning goals of such districts.

Such a program serves as a catalyst in stimulating investments in agricultural developments, new businesses, private and community recreation facilities, improved housing, and other recognized needs. It has clearly demonstrated how planning on a multicounty basis can lead to better living in rural areas.

RC&D projects are, of course, locally initiated and sponsored. They are based on the premise that people in project areas can and will solve their resource problems through their own efforts if given some encouragement and some help by public agencies.

Basically, it is a "self-help" program. We must keep this in mind, for the moment a project becomes an effort directed and controlled by other than local people, its effectiveness is lost.

Another principle that is basic is that the agencies and organizations that give assistance to an RC&D project must work as a team under the direction of local leadership.

Success calls for a concerted effort among agencies and between agencies and sponsors. No one is more important than the others. Working in unison, they can accomplish far more than they could if each pursues its separate program on its own.

I have personally witnessed how many local people from a wide variety of backgrounds and interests pool their efforts with concerned organizations and agencies; refuse to take no for an answer; and achieve cherished goals of better community living and improved economic growth.

Kenneth E. Grant



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Farmer's Mexican food enterprise whets the public's appetite

The Pete Casados enterprise in the Espanola Valley of northern New Mexico is cashing in on the spreading public taste for genuine Mexican foods by growing, processing, and distributing these products to outlets from Albuquerque to southern Colorado.

The farm is one of the success stories of the Northern Rio Grande Resource Conservation and Development Project which now covers public and private lands in four counties. Participating in the project are county, state, and federal agencies with a steering committee composed of local citizens.

Native food products, particularly varieties of chili and corn, which many topnotch restaurants use for Southwest specialty dishes, are produced, processed, and packaged at the farm and marketed through local stores or in bulk to distributors. These Mexican specialty dishes, different from their counterparts "south of the border," come from recipes handed down through generations from the old Spanish American colonists who adopted foods originally grown by the Indians.

Five members of the Casados family are engaged year-round in all phases of the operation. In addition, five other local people are employed permanently, and 25 to 30 work during harvesting and processing.

Casados is expanding his facility, and when it is in full operation, the



Outdoor ovens (ornos) are used to precook corn for Mexican food products. Bernabe Herrera of SCS helps Mrs. Pete Casados stoke the fire.

project is expected to increase the average annual community income by an estimated \$60,000 to provide an average annual employment of 15 man-years.

Several other farmers in the area process and market their products through the facility.

The Northern Rio Grande Project was one of the 10 original pilot projects approved for planning assistance in 1964. It is cosponsored by 26 municipal, county, and state

agencies including the state of New Mexico, Rural Area Development Association, and three soil and water conservation districts.

Pablo Roybal of Taos, chairman of the steering committee, said in one of the sponsors' reports, "It is people, people working together to better themselves, to improve their community and making it a better place in which to live, work and play—for themselves and their children." ♦

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soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES



WILDLIFE ON PRIVATE LAND

Examples of habitat improvement on farmland

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A bird watcher's refuge

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Regrassing the Schoolmarm Burn

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SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: A fledgling robin just out of the shelter of the nest in a farmstead tree plantation finds a protected perch.

Dual cropping . . .

Wildlife by now is firmly established as a second crop on many conservation farms.

Reports from fieldmen submitted for this year's wildlife issue of *Soil Conservation* show convincingly that wildlife cropping is compatible with agriculture.

Examples prove the effectiveness of either individual (Utah, p. 176) or group (Calif., p. 173) action in increasing upland wildlife.

In managing wetlands, two Wisconsin farmers (p. 171) accomplished their purpose by draining part and flooding the rest of their acreage, thereby providing optimum conditions for both grain and wildlife crops on their land.

The same land-management techniques that work on farmland serve as well on refuges set aside specifically for wildlife, as Biologist Louis Moos reports (p. 177) from Montana.

Technical action: A year and a half ago we spotted the announcement that \$99,000 in emergency funds had been allocated to help restore 11,000 acres of recently burned forest and range in Oregon.

A query to State Conservationist A. J. Webber brought the promise of a report when there were tangible results to show for the effort.

SCS Conservationist Ben Mouchett's account (p. 179) of prompt action by the local Technical Action Panel explains how a bad situation was prevented from becoming worse and records a significant conservation accomplishment.

soil conservation

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KENNETH E. GRANT, Administrator, Soil Conservation Service

BEN O. OSBORN, Editor

GEORGIE A. KELLER, Production Editor

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A dual harvest: wildlife and cash grain

By separating wetland from dryland, brothers fashion a paying combination for their Wisconsin farm

By Jack W. Densmore

State resource conservationist, SCS, Madison, Wis.

Muskrats, wild ducks, corn, and soybeans may sound like a peculiar combination of crops on one farm. But the Van Straten Brothers of Shiocton, Wis., find the mixture just right.

With an ingenious system of dikes, ditches, and pumps, the brothers have wildlife wetland and productive cropland side by side on their thousand-acre eastern Wisconsin farm.

Thirty-five years ago, Harold and Dale Van Straten purchased a farm in the Black Slough, a low, wet-soil area subject to frequent flooding from the Embarrass River. An earlier attempt at group drainage had been only partially successful due to backwater from the river.

Crop production was unreliable.

Harold, who was especially interested in hunting, trapping, and fishing, noticed that the flooding was harmful not only to corn and hay but also to wildlife and fish. Duck nests were destroyed and schools of fish were locked in pools that dried up in the summer.

Dale Van Straten was more interested in regular farm operations—corn, alfalfa, and (at that time) dairy cows. Due to flooding and poor drainage, crop yields were limited and erratic.

This dual interest led the brothers to separate the wildlife land from the cropland. They constructed a ditch at the edge of the cropland and placed the spoil on the wildlife side of the ditch to form a dike. The water in the ditches could then be pumped over the dike onto the wildlife land.

As cooperators with the Outagamie Soil and Water Conservation District, the Van Stratens have improved their wildlife land by constructing several miles of level ditches and 11 ponds. Each year they plant about 35 acres of food patches. To further improve drainage on their cropland, they have joined with eight other farmers in constructing a group drainage outlet served by a pumping station.

This water-control system has



Harold Van Straten feeds his trout while ducks keep their distance in the background



Harold (left) and Dale Van Straten sit on the dike that separates cropland from wildlife land. One of their eight small propeller pumps is immediately behind.

been modified and improved until today they have nearly 50 miles of dikes and ditches and eight pumping stations. The pumps are not in continuous use but operate only as needed to control the water on either the crop or wildlife land.

As a result, Dale points to full bins of corn and soybeans while Harold points with equal pride to the abundant wildlife crops.

In an average season, Harold traps some 3,000 muskrats and 35 to 50 mink on their 640 acres of wetland. In addition, 25 hunters from neighboring Fox River Valley cities pay him \$200 apiece for the duck hunting rights. Harold has recently stocked two ponds with trout and two more with catfish with the hope of starting a fee fishing enterprise.

When Harold started selling hunting rights, he charged only \$3 a person for a season and allowed as many as 200 hunters to use the

area. He soon found that this many hunters "burned out" the birds. Twenty-five hunters with the present daily bag limits seems to be about right.

Increasing the number of ducks nesting on the farm or using the area in migration has been one of Harold's major interests. By lowering the water level on the wetlands during June and July, he provides safer nesting areas for the ducks and allows the smartweed and other food plants to grow on the exposed mudflats. In August the wildlife land is again flooded to provide a "banquet table" for the locally raised ducks and those stopping in migration.

Before the duck season opened last fall, the Van Stratens estimated there were 8,000 ducks feeding in their fields. Dale mildly complained, "The ducks made so much noise I couldn't sleep in the morning." ♦

RC&D project measures cover a broad range

The wide variety of activities that local people can carry on under the auspices of an RC&D project is shown in a tabulation of 2,852 project measures that had been activated in 28 projects as of July 1, 1968.

The measures are in 18 different categories, leaving 61 measures unclassified because they did not fit any group. To qualify as a project measure, an enterprise involves group or community action and produces benefits that accrue to the group.

Classified under "accelerated resource development" are accelerated soil surveys, conservation planning, forestry management, ACP cost sharing, special treatment areas, ground-water investigations, and similar services.

The "agricultural water-management development" group includes irrigation and drainage improvements of a group or community nature and not individual farm systems.

"Recreation development" includes outdoor land- or water-based developments of public agencies plus large individual privately owned developments classified as single project measures.

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Total ..	2,852



A wildlife sanctuary on a farm.

Farmers and sportsmen in Yolo County, Calif., have a program for bringing back the days, still vivid in their memories, when wildlife was plentiful and hunting was excellent.

In 1955 an estimated 10,000 hunters came to Yolo County, and 62,500 pheasants were taken. Daily bag limits before noon were not unusual. Hotels and motels were booked solid, and people waited three deep in restaurants.

Then changes in cropping practices—more rowcrops and weed-free cultivation—left wildlife with less food and cover. Their numbers

decreased, especially pheasants, quail, and cottontail rabbits.

In 1962, only 3,900 pheasants were taken, mostly by local people. That year three soil conservation districts in the county and a local sportsmen's club developed a program to help landowners improve wildlife habitats on their land.

The program is administered by a committee of six members: one farmer from each soil conservation district and three sportsmen from the local sportsmen's club. The committee buys materials and distributes and stores plants for wildlife food and cover. The Soil Con-

Farmers rebuild wildlife habitat

Program aims to bring back days of happy hunting in Yolo County

By Kenneth Bigelow

District conservationist, SCS, Woodland, Calif.

servation Service and California Department of Fish and Game supply technical and material assistance.

A technician from the fish and game department is assigned 2 days a week to the Soil Conservation Service office. The Soil Conservation Service trains fish and game personnel in farm planning and use of soil information, and they train soil conservationists in wildlife management and habitat development. The fish and game people and SCS people work together in preparing the wildlife phase of conservation farm plans.

Yolo County is intensively farmed, but the committee has found most farmers have several small plots that can be devoted to wildlife: Ditchbanks, equipment areas, roadways, fence rows, field diversions, and other odd places not being farmed. Since these areas may be sources of undesirable weeds, they are planted with shrubs. Most of the wildlife plants produce an abundance of color during the year, adding esthetic value in addition to wildlife food and shelter.

Most of the planting is on row

Multiflora rose border planting is one sign of habitat improvement.





Pampasgrass under a powerline (above) offers cover and nesting sites. A small nursery on the county jail farm (below) produces wildlife food and cover plants. This lowers the cost of building wildlife sanctuaries.

crop and orchard land with plants such as pampasgrass, pyracantha, dwarf blue gum, and multiflora rose. Quail roosts, brush piles, shrub plantings, and fiberglass quail guzzlers have been installed on several ranches.

In the past 8 years, wildlife plans have been made for an average of 20 farms and ranches a year, and landowners have planted an average of 7,000 plants annually.

The committee has succeeded in getting youth groups to participate. Local Future Farmers of America chapters in Esparto and Woodland raise multiflora rose from cuttings as a school project for credit. Boy Scouts and Girl Scouts use planting projects to earn merit badges.

About four times a year, Boy Scouts participate in a "conservation weekend." The boys camp out and help improve a ranch for wild-

life with plants, fencing, and quail guzzlers.

Several farmers have set aside small acreages for sanctuaries that are open to the public for observation of wildlife. One large sanctuary includes 5,000 acres of undeveloped river bottom and adjacent cropland. This is a joint venture of 10 farmers who permit local youth groups to use the land as an outdoor classroom, camping, and conservation area.

The program was financed by local donations and grant-in-aid funds to the districts. These were matched by Yolo County sportsmen from their share of fines collected by the Fish and Game Department. The program has become almost self-supporting through help from the local jail farm where prisoners raise and care for plants.

The Department of Fish and

Game has made generous game releases on farms and ranches with habitat plans. Pheasants, quail, cottontail rabbits, and chukars have been released in varying quantities.

The SCS reports there is a backlog of requests for planning assistance, and enthusiasm is high among farmers, ranchers, youth groups, and others concerned about encouraging wildlife development. ♦

Cumberland tributary resources studied

An Interagency Study Committee composed of representatives of the U. S. Army Corps of Engineers, Department of Agriculture, and Department of the Interior has been named to review and prepare resource plans for the entire Big South Fork of the Cumberland River in Kentucky and Tennessee.

Other interested federal agencies and Kentucky and Tennessee have been asked to participate in the study. The report is to be made to Congress by December 31, 1969.

Both the Soil Conservation Service and the Forest Service are deeply concerned with resource problems in the area and will participate in the study.

About 90 percent of the Big South Fork watershed is forested, and about a third of it is within the Daniel Boone National Forest in Kentucky.

Part of the drainage area has been intensively mined for coal, both by surface and subsurface methods. Unstabilized strip-mine waste is a serious source of sediment in streams. Acid drainage from abandoned mines also is a problem.

Potentials for watershed development in the upstream areas will be evaluated.

The committee is expected to propose alternative programs for using resources of the basin and contiguous areas for recreation, conservation, or preservation and indicate their potential benefits to the public and the local economy. ♦

Waterfowl in the mountain state of West Virginia?

Well, yes.

West Virginia is not one of the "flyway" states, but wood ducks nest along the slower-moving streams, and black ducks and mallards are not uncommon.

Now, sponsors of the Upper Deckers Creek Watershed Project have included an intensive waterfowl habitat development to attract both nesting and migrating ducks and offset the effects of channeling a portion of the old stream.

Biologists from the West Virginia Department of Natural Resources and the Soil Conservation Service prepared the waterfowl management plan at the request of the Monongahela Soil Conservation District, the project sponsor. The State Division of Game and Fish agreed to reimburse the district for the purchase of affected land and to operate and maintain the installation.

Two dams have been installed,

one above the other, to impound a maximum of 15 surface acres of water. The upper structure holds enough water to flood the lower area and have some left for a resting pool.

The state wildlife agency will seed annual grains in the lower area to provide food for the waterfowl. After the crop is mature, water will be released from the upper structure to make a feeding ground for the ducks.

Ponds have been built to attract ducks and other migrating waterfowl in various parts of the state, but water-level control for intensive management has not been used before in West Virginia. The Upper Decker's Creek development is the first of its kind in this state.

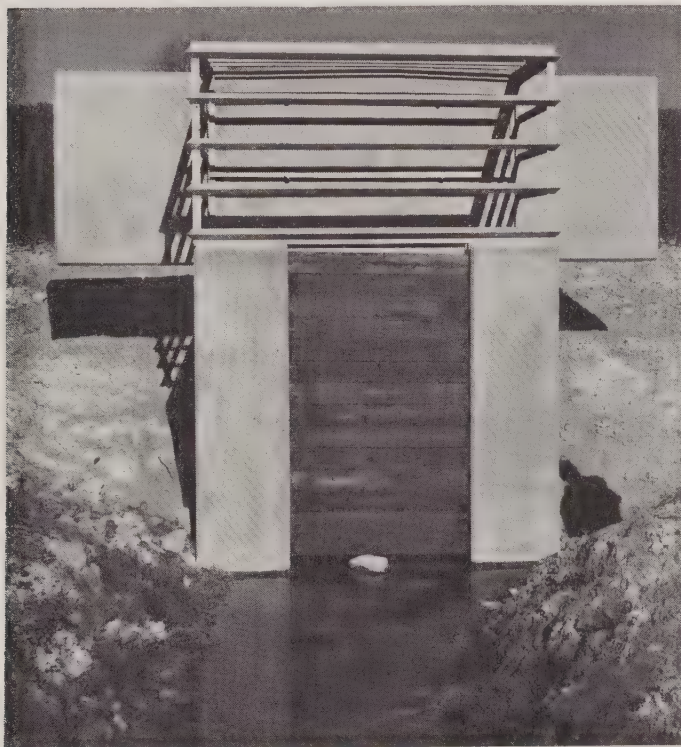
While most biologists don't really expect waterfowl to become an important game species in West Virginia, like deer or turkey, they do see the need to protect present waterfowl habitat and enhance the wetland areas that now exist. ♦

Waterfowl for West Virginia

By William J. Melven

Field biologist, SCS, Morgantown, W. Va.

The water-level control structure (left) enables West Virginia biologists to impound water for ducks during the nesting season and drain the lake to make a feeding area in winter.



A cropping plan for wildlife food and cover makes dairy farm a choice hunting ground

By Verne E. Davison

Biologist, Regional Technical Service Center, SCS, Portland, Oreg.

“I don’t hunt or sell hunting rights,” explained Bill Schorr as we walked and flushed a score of ringnecked pheasants from good cover along his irrigation ditches and small fields at midday in October.

“I let my friends do the shooting. They killed 91 cock pheasants on my place during the 3-day season in 1967.”

Schorr’s small dairy farm is in the Salt Lake Soil and Water Conservation District in West Jordan, Utah. SCS District Conservationist Jim Gatherum has helped him plan his cropping system to include provision of food and cover for pheasants and other wildlife.

In the 5-day cock-pheasant season in 1968, Bill Schorr’s friends enjoyed 73 hunter-days of sport and took home 80 pheasants. On opening day, they harvested 51 birds.

Of his 120 acres, 96 acres is ir-

rigated. The other 24 includes 6 acres of proso millet and oats and 18 acres of cover (for the pheasants) that includes his shaded home grounds and dairy barns.

He has 33 acres of cow pasture, 36 acres of alfalfa hayfields, and 27 acres of corn and wheat.

He runs a dairy herd of 30 milk-ink cows and 20 replacements.

Schorr’s annual pheasant harvest is a surprising yield from so small a farm. Three reasons account for his success:

(1) His exceptional cover for the birds includes Russian-olive, multi-flora rose, a few conifers, and favorable growths of weeds—along his farm roads, about 20 feet on each side of his irrigation ditches, and around the homestead buildings.

(2) He feeds grain twice a day to his cows in the feedlot. The pheasants share the bounty throughout the winter and spring months.

(3) He purposely grows choice pheasant foods to feed the birds in late summer, fall, and early winter.

Waste grain incidentally left afield during harvest helps support the pheasants. There is no shortage of water or good nesting sites. ♦

Agencies unite to protect bald eagles in Alaska

The U. S. Bureau of Sport Fisheries and Wildlife and the U. S. Forest Service have signed an agreement to insure greater protection for bald eagles of southeast Alaska, where the largest numbers of this species live.

Terms of the agreement will be carried out through the regional forester for the Forest Service and the game management agent-in-charge for Sport Fisheries and Wildlife. Both are in Juneau.

The major feature of the agreement is the protection of nest trees in areas where timber sales, road construction, or other operations by man are planned. ♦

USDA awards grant to Israel for conservation studies

Ways to identify agricultural resources by remote sensing equipment carried by aircraft (and eventually satellites) will be studied by scientists at Purdue University, Lafayette, Ind., and the University of Michigan, Ann Arbor and Willow Run, under contracts totaling \$514,000 awarded by USDA.

The studies are sponsored by the Agricultural Research Service in cooperation with the National Aeronautics and Space Administration.

Agricultural surveys by satellites equipped with optical and electronic sensors could, among other things, identify the world’s agricultural resources and help underdeveloped countries in stepping up lagging food production and in developing natural resources, according to ARS officials. ♦

A weedy zone 20 feet wide along each side of irrigation ditches on Bill Schorr’s farm serves as a cover strip and provides food for pheasants and other wildlife.



Freezout Wildlife Management Area

By Louis M. Moos

Biologist, SCS, Bozeman, Mont.

One of the best locations for bird watching in Montana is the Fish and Game Department's Freezout Wildlife Management Area located in Teton County, along Highway 89, between Fairfield and Choteau. During 4 days of June 1968, I recorded 96 species of birds in the vicinity of the lakes, marshes, and uplands of this area.

Bird watching activities begin the last week of March when spring migrants arrive at the lake. One of the greatest attractions occurs the last weekend of March when large congregations of snow geese and whistling swans stop to rest on their northward migrations. An estimated 350,000 snow geese and 11,000 whistling swans have been on the area at one time, plus hundreds of thousands of migrating ducks. Most of the migrations are over by mid-May.

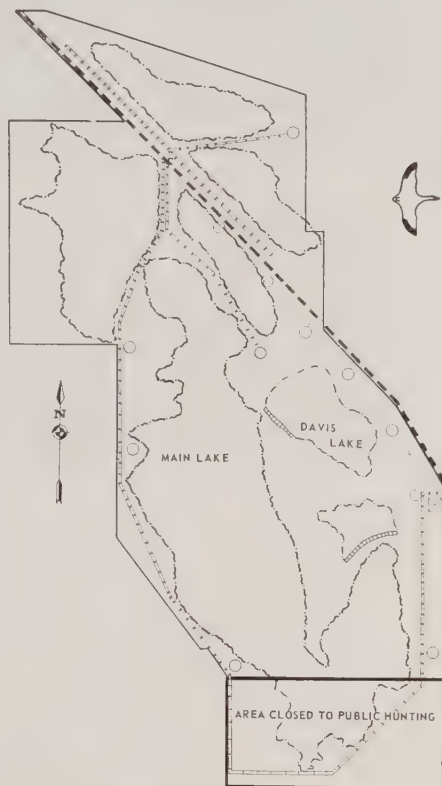
Nesting activity is high from mid-April to the end of May. The young make their appearance the latter part of May or early June.

A show of young birds

The last week of June and first 2 weeks of July are a good time to observe the broods of young ducks and shorebirds. You can also see young grebes riding on the backs of the adults—a characteristic mode of transportation for the very young of this species.

During October and November, ducks, geese, and swans again congregate here in large numbers on their southward migration.

The area originally was a glacial lake bed which dried up each summer. In 1955, the Soil Conservation Service provided technical assistance to develop a complete conservation plan for the area. A soil survey helped select the best areas for crops to be grown for food for



waterfowl and pheasants. Less productive soils were flooded to make additional marshlands. Some uplands were seeded to grass, some planted to trees and shrubs, and others left undisturbed to provide food and cover for wildlife.

A large drainage ditch and dikes were constructed with control structures so water could be maintained at proper depths. Six separate shallow water ponds were created. The dikes serve as roads, and it is possible to drive around much of the marsh area and observe, at close hand, courting waterfowl, nesting ducks and shorebirds, and the broods and young of many water-loving species of small birds.

A varied habitat

The management area now consists of 12,000 acres with many miles of mudflat shorelines; 6,000 acres of water; 800 acres in cropland; 3,000

acres in grassland. Some 20,000 trees and shrubs have been planted. A large island in the largest lake, and numerous manmade islands, provide important nesting sites for thousands of California gulls.

The lake supports an abundant growth of submerged vegetation, mostly sago pondweed (*Potamogeton pectinatus*) and widgeongrass (*Ruppia maritima*), which are important waterfowl foods.

Saltmarsh bulrush (*Scirpus robustus*), formerly called alkali bulrush (*Scirpus paludosus*), grows abundantly in shallow water and is a choice food of snow geese. The seeds are a good food for ducks—canvasback, bluewinged and green-winged teals, gadwall, lesser scaup, mallard, pintail, redhead, shoveler, and widgeon. Muskrats use bulrush stems for house building.

Large colonies of Franklin's gulls nest in the bulrush; also coots, ducks, eared grebes, yellowheaded blackbirds, and sora rails. In 1967, an eared grebe colony was located in saltmarsh bulrush where 1,330 nests were found in an area about 1 acre in size.

An increasing number of ducks nest on the area each year. Other species nesting here include avocet, black tern, cormorant, horned and western grebes, killdeer, longbilled curlew, longbilled marsh wren, marbled godwit, phalarope, red-winged blackbird, sandpiper, and willet.

Among the upland birds nesting here are Brewer's blackbird, crow, eastern and western kingbirds, horned lark, lark bunting, longspur, marsh hawk, meadowlark, ringnecked pheasant, shorteared owl, and vesper sparrow.

For the past 10 years, Audubon Society members from Billings and Bozeman have spent a weekend, about mid-June, banding young gulls, shorebirds, and yellowheaded blackbirds. In 1968, the group banded 2,000 California gulls, 1,900 Franklin's gulls, and several hundred shorebirds and yellow-headed blackbirds in 2 days. ♦

Sawtooth oak holds promise as wildlife plant for Southeast

By Jesse Mercer, Jr.

Biologist, SCS, New Albany, Miss.

The sawtooth oak (*Quercus acutissima*) is growing up as a promising improvement for woodland wildlife habitats in Mississippi.

In the search for a dependable mast producer to supplement native hardwoods, the Soil Conservation Service and the Mississippi Game and Fish Commission began testing the sawtooth oak in 1952. Since that time about 15,000 seedlings have been distributed for test planting to soil conservation district cooperators in the Southeast by the SCS plant materials center, Coffeeville, Miss.

Favorable results have encouraged the SCS to extend its test plantings of the sawtooth oak to

selected areas within the Yazoo and Little Tallahatchie River Flood Prevention Area of North Mississippi. During the winter of 1967-68, through the cooperation of landowners and the U. S. Forest Service, 14,000 seedlings were planted. SCS will evaluate these plantings annually to determine the limitations and value of this plant under field conditions.

The sawtooth oak is native to Japan, Korea, China, and the Himalayan area. It is described as a roundheaded tree reaching 80 feet high at maturity. The leaves have the appearance of chestnut leaves. The acorns require 2 years to mature and are similar in size to those of white oak.

The sawtooth oak is not new to the United States. A specimen at the U. S. Plant Introduction Station at Savannah, Ga., planted in 1923, is 18 inches D.B.H., 50 feet high, and has a canopy spread of 75 feet. Records indicate its complete adaptation to growing conditions in Massachusetts and western New York, and recent plantings show that it is well adapted to the Southeast also.

Most of the information we have on the sawtooth oak in the United States was obtained from two plantings. One, on the University of Georgia campus, consists of 21 seedlings planted in 1937. The other planting consists of 16 seedlings furnished by SCS and planted by the Mississippi Game and Fish Commission on the Choctaw Game Management Area near Ackerman, Miss., in 1952. The average height of the trees on the Choctaw Game

Management Area in 1962 was 30 feet. Some trees produced acorns in 1957 when they were only 6 years old. With the exception of 1967, the acorn crops have been regular and progressively heavier each year since. Yields collected when the trees were 10 years old averaged 29.5 pounds of acorns per tree.

These plantings indicate that sawtooth oak has the following advantages:

(1) The acorn is a choice food of deer and squirrel.

(2) This oak is a much heavier and more dependable producer than native oaks.

(3) The tree begins producing at an early age (6 years of age compared to about 20 years for native oaks).

(4) It is not subject to excessive damage by insects, weather, or decay.

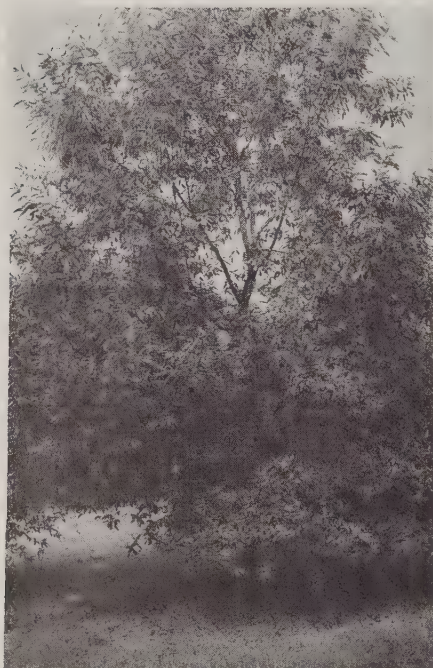
(5) The acorn is not attractive to nongame species, particularly grackles and other flocking birds, thereby making the most available primarily to game species.

The sawtooth oak has aroused some apprehension and unanswered questions. Its value as a commercial tree has not been determined. Foresters wonder if it might become a "weed" tree. So far none of the plantings studied has increased in number of trees.

Vegetative competition has been held to a minimum on the study sites, and the question on the game manager's mind is: "Will this oak survive without care?" The plantings being made within the Yazoo-Little Tallahatchie River watersheds should give the answer. ♦



An 8-year-old sawtooth oak is 28 feet tall and produced 30 pounds of acorns in a year.





Joe Soloy, the seeding contractor, is at the controls of a helicopter taking on seed for a run over the Schoolmarm Burn. This equipment seeds about 8 acres a minute in a 70-foot swath.

TAP and the Schoolmarm Burn

By Ben Mouchett

District conservationist, SCS, The Dalles, Oreg.

Technical Action Panel moves quickly to heal effects of forest and range fire

When several lightning strikes touched off a massive, destructive fire in late August 1967, folks around The Dalles, Oreg., found out what a Technical Action Panel is and does.

The Wasco County Technical Action Panel (TAP), made up of representatives of U. S. Department of Agriculture agencies in the county, wasted no time organizing an all-out effort to overcome a disaster with potential for becoming even greater.

Three costly days

In 3 days of hot, stubborn fury, fire ravaged grass, brush, and timber on nearly 11,000 acres of rugged mountain land in the Schoolmarm Springs area between Mt. Hood and the Columbia River. More than 8,000 acres was private farm and ranch land; another 1,200 acres was federal land managed by the U. S. Bureau of Land Management.

The truly critical area was more than 1,200 acres of watershed where

The Dalles, a town of some 12,000 people, gets its water supply. With fall, winter, and spring rain, snow, and runoff approaching, the denuded slopes were ripe for erosion which could pollute the water supply.

The area was still hot and smoldering when Wasco County TAP members held an emergency meeting August 24 at the request of Northern and Central Wasco soil and water conservation districts to plan strategy for protecting the area.

On hand were Eugene Denny, Farmers Home Administration, TAP chairman; Leland Hardy, Soil Conservation Service, representing Ben Mouchett, district conservationist and cochairman; Les Fredrickson, Agricultural Stabilization and Conservation Service; Robert Chadwick, Forest Service; and Tommy Thompson, Extension Service.

The situation was grim. True, the fire was controlled. But blackened tree trunks stood starkly in a

desert of fine, white, still-smoldering ashes—all that remained of the grass and brush that once protected the steep slopes.

Seeding was the obvious answer, but the seed would not germinate until late spring. Seed and soil, meanwhile, would be at the mercy of rain and runoff water. Diversions to slow the runoff and direct it to safe watercourses would help. But action was needed—fast.

On-the-ground planning

A tour of the area was promptly arranged. This time, in addition to the federal TAP members, representatives of the State Department of Forestry, State Game Commission, Oregon State University, soil conservation district, and the city of The Dalles took part.

The upshot of the tour: The local SCS staff was given technical leadership for the rehabilitation project. Applications for emergency federal and state help were to be pushed through swiftly. All involved agencies and private indi-

viduals would cooperate with the financing and the work as much as possible.

Bill Caldwell, State Department of Forestry, provided helpful low level aerial photographs of the burn area.

Less than a month after the tour the Secretary of Agriculture announced that the Department would allocate \$99,000 for the rehabilitation. Subsequently, state and local agencies pledged \$65,000, the Agricultural Stabilization and Conservation Service pledged \$40,000 in matching funds to farmers, and the Bureau of Land Management pledged \$23,000.

A contract was made with Merric, Inc., of The Dalles to seed the area by helicopter. On October 26 seeding started, and by November 13 it was completed on the burn area. By December 9, the diversions were completed and fire trails and other disturbed areas were seeded.

All that man could do

In a little more than 100 days from the time of the first emergency TAP meeting, an imposing list of local, state, and federal agencies and 30 landowners had gotten together and completed all that they could do to protect the natural resources damaged by the fire.

The diversions would help during the months immediately ahead—how effectively depending on how heavy precipitation and runoff would be. The seeding would help next year after grass, brush, and trees were established.

There are many smiling faces now in The Dalles and in the offices of agencies that pitched in with landowners to get the job done.

The grass has covered most of the burn area. Only some of the south slopes failed to “take,” where the soil is thin and steep. Even there native grass is coming on.

Nature seemed to cooperate with the concerned landowners and conservationists. All winter, precipitation was light, and no heavy runoff



developed. Then the rains came in May and the grass began to shoot up in a carpet of green among the black trunks and logs. The crisis was past. Nature will do its own seeding from now on.

The inventory of what was accomplished in those hectic days after the fire is impressive:

Nearly 123,500 pounds of grass seed in varying mixtures were broadcast by Joe Soloy of Merric, Inc.

Trees and shrubs from seed

Bitterbrush seed was added for wildlife in seeding 1,100 acres of city watershed—a recommendation of the Oregon State Game Commission. Paul Ebert, biologist for the Oregon State Game Commission, reports good germination of bitterbrush seed. An examination of the area in August 1968 showed more than 600 live tree seedlings per acre. A check of a similar area that was not seeded showed only 67

Charred tree trunks and logs tell of the devastation of this mountain range by the fire in August 1967. Prompt action in reseeding the burn had restored a grass cover by the following spring. At right, Ben Mouchett, SCS district conservationist, looks at a reseeded slope and, below, shows the vigorous root system on a seedling. Scorched cropland, at right, was loosened with a rotary subsoiler, and diversions were constructed across fire trails, below, to reduce erosion.





live tree seedlings per acre from natural seeding.

Three hundred and fifty acres in the city watershed were seeded with ponderosa pine and douglas fir seed.

Nearly 350 acres of burned cropland was subsoiled to aid water penetration into the soil.

Some 2,700 feet of diversions were constructed on burned cropland to lead excess runoff water into protected outlets.

Forty-two miles of fire trails were constructed and "waterbarred" to reduce erosion in the surrounding areas. These small hillside diversions were built 150 feet apart and averaged 25 feet long—adding up to a total of more than 35,000 feet of diversions.

The 42 miles of fire trails also were seeded to grass to help stabilize the soil. This is equivalent to 138 acres of seeding in this highly critical area.

Around Wasco County, especially The Dalles area, TAP is no longer just another alphabet title for some government bureau. "Technical" means know-how, and "action" means just that.

Ernest Kuck, rancher and owner of more than 3,000 acres in the burn, says: "This was a necessary job that gave excellent results."

Joe Hasbrouck, public works superintendent, city of The Dalles: "There is a good grass cover in the city watershed that will certainly help protect the city filtering plant."

Bob Bailey, chairman of the Northern Wasco Soil and Water Conservation District, who chaired the early organizational meetings while the application was being developed: "Good example of what agency and private individual co-operation can do."

To TAP members, it means confidence. They know that through TAP they can work together and get things done—in a hurry if necessary. The Schoolmarm Burn rehabilitation proved that. ♦

Work of Spanish padres still waters Texas crops

By J. C. Ward

Civil engineer, SCS, Fredericksburg, Tex.

What did Franciscan padres in the early 1700's have in common with modern conservationists? The answer, many conservationists and engineers are amazed to discover, is that both have used the same soil and water conservation standards to build irrigation systems.

The Espada and San Juan diversions were built sometime between 1731 and 1745 on the San Antonio River and are still watering Texas crops. Sound construction has made them the oldest continuously used irrigation system in the United States.

Stone by stone

Espada Dam is a mile north of the famous Mission San Francisco de la Espada in the Alamo Soil and Water Conservation District. The dam was hand-built by Franciscan padres and Indian converts by laying flagstones on a natural stone ledge foundation.

It is said that the mortar was mixed with goat's milk to make it waterproof and then allowed to dry slowly, stone by stone. The lime salts, carried by the water, have been deposited among the stones to fill the crevices and form a solid dam.

Today's experts marvel at this remarkable engineering feat. It



An aqueduct, built across a stream in 1731, still carries water for irrigation.

takes one exception with current standards, as it is "curved the wrong way," yet it has withstood hundreds of destructive floods.

Espada Dam diverts some 4,500 gallons of water a minute into a 4-mile long irrigation ditch known as Acequia de Espada. It was built by Indians 20 feet at a time, but how the nonerosive grade of 10 feet per mile was engineered is unknown.

The acequia provides irrigation water by gravity flow for about 400 acres of land near Mission San Francisco de la Espada. A massive stone aqueduct crossing at Piedras Creek is preserved as a historical monument by the San Antonio Conservation Society.

A similar system, called the San Juan, is located 1 mile above the Espada diversion dam and was built

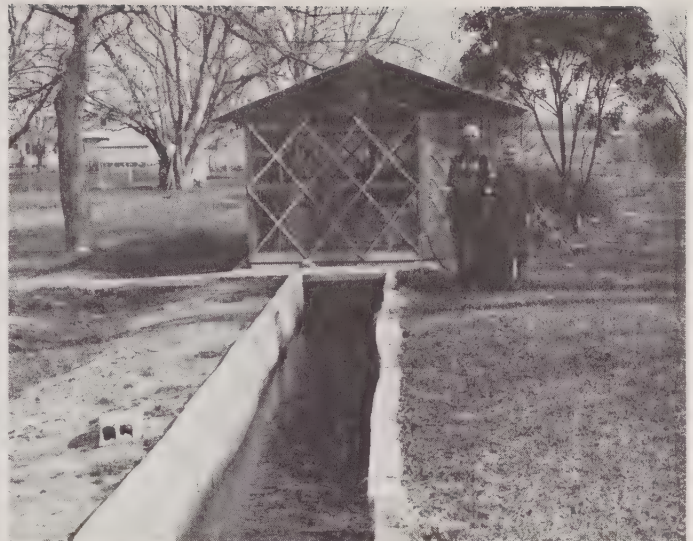
at the same time. In 1910, the 5-mile long San Juan acequia irrigated 17 farms; today 770 acres are irrigated on 30 farms.

The water rights for the San Juan and Espada diversion dams and acequias date back nearly 250 years and are still legally recognized. Mr. and Mrs. Garrett Lewis, who own 12.5 acres on the San Juan ditch, can trace their water rights back to 1824 when Mexico still owned Texas. At their summer cottage built across the acequia, they can fish and relax to the timeless tune of running water.

Water rights today are patterned after the Spanish system. In those days, the King had to grant the right to divert water—the laws did not permit altering the flow of a river or using the water without first obtaining a permit from the



Henry Graf, commissioner for the Espada District, displays turnips raised on part of the 500 acres irrigated by the Espada irrigation system. At right, Mr. and Mrs. Garrett Lewis enjoy their cottage built over the San Juan ditch.



Spanish Government. Any dam on a river, whether navigable or not, required a permit from the supreme government.

A farmer's grant

Here's a sample Spanish irrigation permit quoted from records of the Supreme Court of Texas, Report No. 8304: "In 1823, Francisco Maynez filed his application for 'three days of irrigation water with the corresponding land for cultivation.' The application of Maynez was forwarded to the Aguntamiento of Bexar on December 23, 1823. On the 5th of February, 1824, Don Antonio Saucedo issued a title in these terms '—knowing of the merits of the petitioner Francisco Maynez, his good behavior and his devotion to agricultural toil, I have decided to grant him and do hereby grant him in the name of the Mexican nation, two dulas of water with the accompanying land for cultivation, the water to be taken from the conduit of the Mission of San Juan Capistrano so that as his property, he may cultivate and enjoy the land within the terms prescribed by law, and so he and his successors may profit from it, with the lien (pension) of ten pesos annually which he must pay for the said two dulas granted him for the period of four years, in accordance

with the provisions of the Excellent Provincial Deputation. After which he may enjoy the two dulas of water, clear of all encumbrance and as such, he may sell or alienate them at his pleasure—'."

Timely portions

A dula, according to grants and documents of early Texas history, is equivalent to a day of water from an acequia. Spanish rights defined dula as "all that time in which the water for irrigation, divided in days between the different plats or estates, would flow their course until all of the plats would enjoy the water, and then the turn would start anew."

In 1900 local landowners founded the San Juan Irrigation Company. Each landowner adjacent to the acequia owns a share in the company. Each receives water at the rate of $\frac{1}{2}$ hour for each acre of land he owns. The watering cycle is set to rotate every 10 days on the 5th, 15th, and 25th of each month. A local employee, Jim Maspero, has been a ditch rider on this project since 1918.

The Espada Irrigation Company allots 1 hour of water for each acre of land. With the type of soil found in this area, the forethought and planning of the early settlers fit in very closely with present-day con-

servation irrigation requirements. Crops produced are vegetables, grain sorghums, small grain, and irrigated pastures.

The San Juan and Espada irrigation dams, acequias, and aqueducts are remarkable feats of engineering. They justly deserve all historical recognition given them by the State of Texas, the city of San Antonio, and the San Antonio Conservation Society. ♦

Survey reveals erosion in New South Wales

Some 48 million acres of land in the Eastern and Central Divisions of New South Wales is affected by soil erosion, according to results of a survey conducted in 1967 by Australia's Soil Conservation Service.

The area subject to gully erosion had increased about 2 million acres since a similar survey 25 years ago, in spite of the fact that 1.6 million acres had been treated with structural works, and the erosion brought under control. A reduction of $15\frac{1}{2}$ million acres has occurred in the areas affected by sheet and wind erosion, but more than 3 million acres subject to these types of erosion has deteriorated to gully-type erosion. ♦



Four water-control structures like this in the Seventh Ward Canal prevent salt water intrusion, maintain a fresh water level for irrigation up the canal, and give protection from flooding.

Louisiana project controls tidal waters

By Gene Warren

Assistant to State conservationist, SCS, Alexandria, La.

Salt water won't bother Louisiana rice farmers in Vermilion Parish any more since the Seventh Ward Canal Watershed Project turned back the Gulf tides with a gate structure that serves three purposes.

It keeps floodwaters from backing up the Seventh Ward Canal from the nearby Vermilion River, keeps salt water out of the canal during high tides and drought, and keeps in fresh water during low tides and strong north winds.

"We feel that the project has already just about paid for the \$138,000 invested in it by keeping salt water from our back doors this year," said Leopold Noel, president of the Seventh Ward Gravity Drainage District.

In 1960, the Iberia-Vermilion Soil and Water Conservation District, the Seventh Ward Gravity Drainage District, and the Vermilion Parish Police Jury applied for Public Law 566 funds to plan the project. After the application was approved by the State Soil and Water Conservation Committee, the Soil Conservation Service completed

the plan for the 32,000-acre project in 1963. The plan was approved for construction in 1964.

Several problems had spurred the more than 100 rice farmers in the watershed area into action. Salt-water intrusion, flooding, and agricultural drainage were the three main problems outlined in the application. Plans to solve these problems called for construction of four structures at selected points along the series of ditches and canals. Improvement of the 40 miles of channels and construction of 3.5 miles of protection levees were also part of the project plan. Structure installation got first priority in the two-pronged water-management program.

"The type of structure needed," Noel explained, "was to be the first of its kind in Louisiana, so we went to the Gulf Coast area of Texas to borrow some ideas. We found some over near Anahuac that were just what we needed."

The first structure was completed in 1966. The last one went into place in March of 1967.

"As far back as I can remember, saltwater in Seventh Ward Canal has been a headache," said Raywood Bernard, another drainage district member and rice farmer using the canal water.

"In the last 15 years salt water has been the cause of two almost complete crop failures in 1952 and 1963. Salt water would have taken its toll in profits in 1967 had it not been for structures already in place.

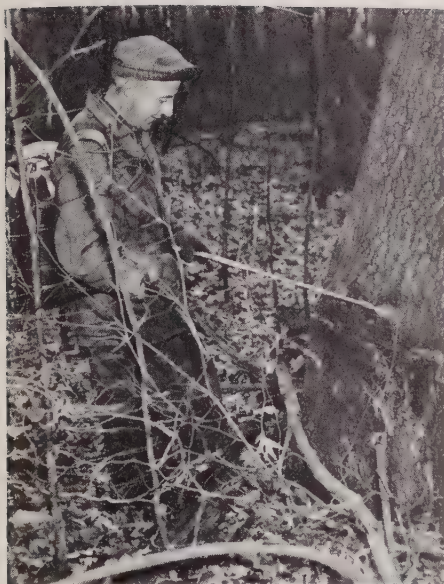
"Rice growth is affected when water with over 45 grains of salt per gallon is applied. The water in the Intracoastal Waterway tested as high as 65 in April.

"More than a hundred pumps are located at different points along Seventh Ward Canal. They pump water on more than 7,500 acres of rice," Bernard pointed out. "I figure my 80-acre crop watered from the canal would have been down 10 to 15 percent without the aid of the structures. Most of the other canal farmers would probably have been in the same boat."

Additional benefits from agricultural drainage and flood prevention as a result of channel improvement and levees are coming from the next phase of the project.

The success of a watershed project doesn't stop with the installation of structures. Soil and water conservation district cooperators also plan to apply conservation land treatment on the 32,000-acre watershed. Practices such as on-farm drainage, land leveling, erosion-control structures, and planting grasses and legumes in rotation are part of these plans ready to be put into action. These practices are geared to help keep down erosion, condition the soil for better water intake, and to bring about total water management.

This project is one of 21 Public Law 566 projects under construction in Louisiana. It is a prime example of how Federal agencies, the State Department of Public Works, and local agencies and groups can work together to solve water-management problems. ♦



Don Huff, woodland contractor, applies herbicide to a large wolf tree that has been girdled.

Timberland in Holmes County, Ohio, is taking on a new look. Landowners are cooperating with their conservation district to improve the quality of woodlands and make them more valuable in the future.

Holmes County has nearly 90,000 acres of woodland, comprising 30 percent of its area. It is all privately owned. Farm woodlots range from a few acres to about 300 acres per farm.

To encourage woodland improvement and add to the economic assets of the community, the Holmes Soil and Water Conservation District board of supervisors located three woodland contractors and got them started to working in farm woodlands. The Soil Conservation Service helped by planning for woodlands in farm conservation plans, and the Agricultural Stabilization and Conservation Service by sharing the cost of improvement practices. The state forestry division provides onsite technical assistance.

The contractors—John Alazaus of Carrollton, Carl Malthus of Dover, and Don Huff of New Philadelphia—are busy on timber stand improvement projects on many

Conservation district finds contractors to do woodland improvement on farms

farm woodlands. They girdle undesirable trees, kill grapevines, and chemically treat weed trees. The result is better spacing between the remaining desirable trees.

In the short time the program has been underway, nearly 900 acres has been improved by the woodland-improvement contractors.

Cost of the improvement runs between \$15 and \$27 an acre. The ASCS cost-shares 80 percent of the total cost. The out-of-pocket expense to the farmer is easily recovered within a couple of years through the new growth that develops as a result of reducing the

competition from poor species.

Dave Schatz, farm forester for the Ohio Division of Forestry, works between the district and the landowner. He marks the woodland for the improvement work and develops the cost estimates.

After the work is done, the Ohio Forestry Association reviews the landowner's accomplishments and recognizes those meeting its standards as Tree Farmers. Nearly 30 landowners in Holmes Conservation District have been so honored.—ADRIAN ACHTERMANN, *district conservationist, SCS, Urbana, Ohio.* ♦

Farm Forester Dave Schatz demonstrates to woodland owner, Joe Martuch, Jr., how to girdle a damaged and forked tree.



Water management raises income in RC&D area

The Pri-Ru-Ta Resource Conservation and Development Project in Wisconsin is increasing income of farmers and related businesses as a result of rescuing farmland from excess water.

In 4 years 67 Rusk County landowners have installed 18 group drains to remove excess surface water from 1,500 acres of cropland. They estimate they have increased their total annual income by \$29,990.

Alex Turanski says the drain across his land has kept him on the farm. He has added 15 to 20 cows to his herd, an addition to his barn, and he has remodeled his home. Four years ago he was about ready to give up and move away.

Last year Turanski was named the outstanding district cooperator by the Rusk County Soil and Water Conservation District and was the guest of Goodyear Tire and Rubber Company for a week at their ranch in Arizona.

Cropland needing surface drainage in Rusk County.



The Rusk County District coordinated the drainage work. The Agricultural Conservation Program shared the cost, and SCS provided technical assistance for the \$52,000 project measure.—NORMAN KAHL AND F. L. ROBBINS, *area extension agent, Wisconsin Extension Service, Ladysmith, Wis., and area conservationist, SCS, Spooner, Wis.* ♦

Conservation for urban people

By LeRoy Willie

*District conservationist, SCS,
Baton Rouge, La.*

What is it like to be a soil conservationist in an urban-suburban area?

Two of us serve East Baton Rouge Parish in the Feliciana Soil and Water Conservation District of Louisiana. The parish has a small land area with a population of about 280,000.

Urban and suburban people earn their living in jobs far removed from the soil. Many of them have a difficult time relating information on soil and water conservation to neighborhood problems, and they do not often volunteer to support conservation programs.

Our aim is to help urban people realize that conservation is meaningful in town as well as country and that the technical knowledge of the Soil Conservation Service can benefit them. We carry out an intensive information program to reach these people, and we work with the governing officials of the boards and commissions to get this technical information and service applied in cities, towns, and suburban areas.

To obtain the support of the general public we conduct a regular live TV program during the noon hour. The program material is taken from a multiparish area

around Baton Rouge. We present the material so that it will appeal to urban as well as rural people, a necessity in today's TV programming. The same approach is followed on three radio programs each week.

We also prepare regular newspaper articles plus intermittent full-page feature stories for publication in the Sunday paper.

Official planning bodies in the area are showing increasing concern for good land use and conservation. Realtors and land developers support efforts to speed up soil mapping.

Among recent indications of urban interest in conservation are: The Capital Region Planning Commission has asked the Soil Conservation Service to make a feasibility study of a watershed project to be co-sponsored by the City-Parish Council. The City-Parish Beautification Commission wants SCS to help develop a plan that would hide ugly areas and to beautify other areas. The Louisiana State University and Southern University are cooperators with the Feliciana District, and the Capitol Economic Development Administration has endorsed the idea of resource conservation and development and is asking the local police juries to sponsor an eight-parish RC&D project. ♦

Harmonious balance in urban environment is RC&D goal

A harmonious balance between future urbanization and the natural environment is the aim of the Eastern Connecticut Resource Conservation and Development Project, recently authorized to receive USDA technical and financial help in planning.

The project is sponsored by the Connecticut Commissioner of Agriculture and Natural Resources. The project area includes 890,000 acres in the 40 eastern cities and towns in Tolland, Windham, and New London counties. ♦

A new soil and water conservation demonstration in India to show how methods time-tested by United States farmers can help Indian farmers raise their production is being established by the Soil Conservation Service through joint USDA/U. S. Agency for International Development programs.

The 15,000-acre water-management project in the State of Punjab in northern India is the second to be established in that Nation by SCS and is one of 57 such USDA/AID development projects.

A team of four SCS specialists, with headquarters in the town of Patiala, will work with Indian Government conservationists in operating the Punjab project.

E. Pershing Vance, assistant state conservationist from Bozeman, Mont., will head the team. Other team members are Hubbard Y. Cott, conservation engineer at Hays, Kans.; Kermit E. Larson, soil scientist at Grand Forks, N. Dak.; and Howard M. Ivory,

Second SCS project in India to help farmers raise yields by water and soil management

agronomist, SCS, Provo, Utah.

Principal team objective will be to show Indian farmers how the Punjab land, with proper soil and water management, can achieve higher yields of rice, wheat, and other crops.

D. A. Williams, who retired as SCS Administrator in January to become a water-management adviser for the Ford Foundation in India, says water is limited in the Punjab project area but, with proper management, there is enough for productive farming. Soils vary widely, too, but can also be treated and managed for good results.

The water comes from wells and huge impoundments and is transported by great canal systems and, because of distances involved, usually is released by a schedule not always in keeping with farmers' needs.

Many irrigation systems in India are designed so that when water is allotted, every farmer gets some but not always enough for efficient use. This has meant reduced yields at times and high water losses. However, the Government of India now recognizes the need for policy leading to more efficient water use. The SCS project is part of India's efforts to put this policy to work.

An earlier USDA/AID project in the state of Mysore is underway staffed by Guy Nutt, formerly of Denver, as project leader; Eugene J. Pope of Bismarck, N. Dak., civil engineer; Gerald Kester of Escondido, Calif., soil scientist; and Eugene W. Shaw of Nelson, Nebr., agronomist.

Director of the SCS technical assistance program in India is John T. Phelan, former assistant director

of the SCS engineering division in Washington. Phelan, in Washington recently for conferences on a proposed third water-management project in the Uttar Pradesh State in North Central India, believes Indian farmers are making rapid strides toward self-sufficiency in agriculture.

"Agricultural progress has top priority in the Indian effort now," he said. "There is a good chance that India will be able to produce all its food needs in just a few years more. Good moisture enabled Indian farmers to produce enough wheat this last season, and in spite of drier conditions, the coming crop may equal last season's. New technology and improved crop varieties are making a big difference."

Serving with Phelan in New Delhi are James R. Coover, soil scientist of Temple, Tex.; Eugene N. Sperry, state conservation engineer for Montana at Bozeman; Donald Jones, agricultural economist from Portland, Oreg.; and Francis Roberts, resource inventory specialist from Ephrata, Wash.

India, a Nation with 535 million people, purchases only negligible quantities of farm products from the United States—currently about \$28.9 million worth. If the Indian economy—spurred by such programs as those of SCS—should now begin to move ahead in a rapid sustained fashion, the United States can expect to sell large and growing quantities of United States farm products in exchange for India's tea, copra, and cashew nuts.

In 1968, more than 400 USDA specialists worked in some 40 developing nations of Latin America, Asia, and Africa under USDA/AID programs. ♦

To encourage water-saving structures, the Government of India shares the cost of concrete-lined irrigation ditches and other conservation measures constructed by farmers.



Meetings . . .

North American Wildlife and Resource Conference

The North American Wildlife and Natural Resource Conference will meet in Washington, D.C., on March 2-5. "Conservation in an Urbanizing Society" is the theme of the conference.

Two general sessions will focus attention on the conservation and natural resource problems arising from the shift in population to metropolitan areas. The six technical sessions will report progress in wildlife research and management.

All sessions of the conference are open to the public without charge.

Wildlife Week calls for habitat effort

The growing need to provide and protect living spaces for wildlife will be emphasized during the March 16-22, National Wildlife Week. The theme, "Provide Habitat—Places Where Wildlife Live," is being sponsored by the National Wildlife Federation.

United Nations to consider worldwide pollution problems

The General Assembly of the United Nations has voted to hold an international conference in 1972 to explore the possibilities of co-operation to "eliminate the impairment of the human environment."

A resolution in behalf of the conference, sponsored by 54 members of the 126-nation body, notes the continuing and accelerating pollution of air and water, the deterioration of soil through erosion and overuse, the long-term effects of biocides, and the emotional impact of noise and the pressures of urbanization.

As directed by the resolution, the U.N. Secretary General, after consulting with various authoritative sources, is to report to the next

General Assembly on the nature, scope, and progress of all work going on in the field of human environment.

Dates and places

March 2-3, The Wildlife Society, Washington, D. C.

2-5, North American Wildlife and Natural Resources Conference, Washington, D. C.

9-11, National Research Council, Washington, D. C.

9-11, National Association for Community Development, Washington, D. C.

14-20, Associated General Contractors, Washington, D. C.

16-19, National Farmers Union, Hot Springs National Park, Arkansas.

16-20, Association for Supervision and Curriculum Development, Chicago, Illinois.

20-26, National Lawn and Garden Week.

21-25, National Science Teachers Association, Dallas, Tex.

April

9-25, International Commission on Irrigation and Drainage, Mexico City, Mexico.

11-14, National Forest Products Association, Washington, D. C.

19-24, American Society of Planning Officials, Cincinnati, Ohio.

22-23, American Forest Products Industries, San Francisco, Calif.

23-24, Industrial Forestry Association, Portland, Oreg.

25-29, National Audubon Society, St. Louis, Mo.

28-30, National Academy of Sciences, Washington, D. C.

28-May 2, League of Women Voters, Council Meeting, Washington, D. C.

28-May 2, American Forestry Institute, New Orleans, La.

30-May 1, International Land, Pasture, and Range Judging Contest, Oklahoma City, Okla.



"Littering is loony!"

KAB-6

Review



Biological Associated Problems in Freshwater Environments—Their Identification, Investigation and Control. BY KENNETH M. MACKENTHUN AND WILLIAM MARCUS INGRAM. 1967. *Federal Water Pollution Control Administration*. 287 pp., illus.; paper. \$1.25.

This book has three stated objectives: To help the person who must investigate, identify, and control biological problems related to water quality; to aid the nonbiologist to understand the aquatic environment; and to provide a guide for gathering and interpreting field data in aquatic biology. These objectives are successfully achieved in 12 clearly written chapters.

The first five chapters review the uses of water and the legal aspects of pollution; explain the intricacies of the aquatic environment and how plants and animals respond to changes; and tell how to investigate aquatic biological problems. The remaining seven chapters deal with aquatic plant and animal pests, how to identify them, and how to control them. Each chapter includes a list of cited literature. The few technical terms that are used are defined in a short glossary.

Anyone concerned with water quality in stream, lake, reservoir, or pond, whether for recreation, industrial, domestic, or some other use will find this book helpful.—LAWRENCE V. COMPTON, head biologist, SCS.

The Nation's River. 1968. *The Department of the Interior official report on the Potomac*. U. S. Dept. Int. 128 pp., illus.

In February 1965 the President directed the Secretary of the Interior to review past plans for the Potomac River Basin and to develop a program which would clean up the river and keep it clean, protect its scenic beauties, and provide

adequate recreation facilities. Among the objectives of the program was to assure an adequate water supply, both now and in the future, for residents of the basin.

This is the final report of the Secretary to the President, presumably a summation of several exhaustive studies by specialized task forces. It is an attractive book of easy-to-follow text, obviously designed to reach the lay reader. It should achieve its purpose and help in understanding the complex problems of the "Nation's River."

The report directs itself principally to the preservation of the scenic values and the development of the recreation potential of the Potomac. One of the positive recommendations urges prompt legislative authorization and funding of a Potomac National River Complex, consisting of federal, state, and local components, to provide a "green sheath" along the main stem of the river from Washington to Cumberland, Md. The report also recommends that the long-deferred restoration and improvement of public facilities along the Chesapeake and Ohio Canal be initiated immediately.

There are other resource development needs in the basin. Of major concern is the problem of increasing pollution in the river, the estuary, and in some of the tributaries. Another is water supply, particularly in the metropolitan area. And erosion and sedimentation are proceeding at the rate of about 2.5 million tons of material deposited in the estuary each year.

The report considers all these philosophically and discusses various methods of control. It recommends that one major reservoir already authorized be funded and constructed immediately; six others are identified.

The report points out that water supply and flooding in localized areas may often be solved with headwater reservoirs included in watershed plans developed by local sponsoring organizations with as-

sistance from the Soil Conservation Service. It indicates that headwater reservoirs are needed and feasible in 61 small watersheds in the basin. The contributions of soil conservation programs in reducing erosion and sedimentation are recognized.

The Potomac River Basin has been studied over a long period of time. Plans have been made and programs have been recommended, but little action has resulted. The major reason is the wide divergence of interests involved. A plan of improvement that would satisfy some interests usually is vigorously opposed by another group. The end result usually is a plea for further study.

Although the report has positive recommendations concerning the preservation of scenic values and the development of recreational opportunities, it becomes vague in other critical areas. This is most apparent in the areas of pollution abatement and water supply which are among the real knotty problems. In these areas, the report follows the time-tested procedure of recommending further study.—CARL D. FETZER, *River Basins Division*, SCS, Washington, D. C.

Extinct and Vanishing Animals. By VINZENZ ZISWILER. 1967. *Revised English edition by Fred and Pille Bunnell.* Springer-Verlag New York, Inc., New York. 135 pp., illus.; paper. \$3.40.

This is the revised and English version of a book that first appeared in German. It is a reasonably complete report of the subject of its title.

Several accounts, however, are badly garbled. One wonders if these were in the original edition or came about through translation and revision.

It tells how world wildlife is being destroyed, why this should be stopped, and what can and is being done about it.

The authors decry the senseless destruction of the wildlife resources but they are not eccentric nature

fanatics. In the introduction to Chapter 5, "Protecting Nature," they state, "The protection of nature must have the preservation of mankind as its ultimate end. Man should and must utilize nature wherever he can and wants; but this utilization must not cause permanent damage to the natural equilibrium." LAWRENCE V. COMPTON, *head biologist*, SCS.

New publications

Biological Conservation. October 1968. Vol. 1, No. 1. Elsevier Publ. Co., Ltd., Essex, England. \$14.40 plus \$1.20 postage per volume. An international journal edited by Nicholas Polunin, Geneva, Switzerland.

Biological Conservation is of special interest to soil conservationists. It is concerned with "the preservation of plants, animals, and all nature, and with the conservation or wise use of the biotic and allied resources of the land, water, and air."

The first issue presents 12 technical papers including several dealing with various aspects of land use and land management. One of these, "Conservation and Land Management" by the Viscount of Arbuthnott, analyzed the 200-year land-use history of a Scottish estate in light of the practicality of the application of conservation principles by a land manager. This interesting paper concludes, "Indeed the landowner or occupier, through his stewardship, is the only effective long-term guardian of the natural resources of the countryside. On his conservation measures, built into the efficiency of his primary land-management function, will depend the kind of rural environment future generations will enjoy."

In addition to the technical papers, there are a large number of shorter articles. There is also a section reporting on conferences and meetings, another one on reviews of important papers and books, and a third one on conservation around the world.

Natural Resources of North Dakota. 1968. U. S. Dept. Int. 46 pp., illus. \$0.60. Twentieth in the Department of the Interior's series of booklets describing the natural resources of the states, this one on North Dakota ranks agriculture as the mainstay of her economy with mineral production and recreation as other major sources of income. The attractive booklet describes the physical environment, mainly one of prairies and plains, and sketches the history of Indian and White settlement. There is also a description of the conservation programs of the various government agencies related in alphabetical order.

Agricultural Development and Expansion in the Nile Basin. BY CLINE J. WARREN. 1968. *USDA Foreign Agr. Econ. Rpt.* 48. 114 pp., illus. Completion of the Egyptian High Aswan Dam and the Sudan's Roseires and Khashm El Girba dams in the Nile River Basin will expand the basin's cultivated area by about 3 million acres. This study of the implications for United States agriculture of these developments indicates that if used only for domestic food output the additional cultivated land could erase the area's food deficit. Export crops—notably long-staple cotton—will likely account for a good share of the new land, however, especially in the Sudan. A sizable expansion of cotton acreage in the Nile Basin over the next decade will have a decided impact on world and United States cotton prospects.

Status of Rural Housing in the United States. BY RONALD BIRD, LUCIA BEVERLY, AND ANNE SIMMONS. 1968. *USDA, Agr. Econ. Rpt.* 144. 31 pp. A summary of data from the 1960 census of housing indicates that rural housing is less adequate than urban housing primarily because a larger percentage of rural homes lack inside plumbing. The authors believe that rural housing has improved considerably since 1960, but the condition of housing occupied by the rural poor may not have improved very much.

Indian American Arts, No. 1. 1968. *Indian Arts and Crafts Board, U. S. Dept. of Int.* 59 pp., illus. \$0.65.

The first of a new series of publications of special titles deals with the Institute of American Indian Arts at Santa Fe, N. Mex., its students, and their works. It is a part of the Arts and Crafts Board's program to encourage the arts of Native Americans—The Indians, Eskimos, and Aleuts. The new serial supersedes the Board's news circular *Smoke Signals*.

Status of Water and Sewage Facilities in Communities Without Public Systems. BY LUCIA H. BEVERLY. 1968. *USDA Agr. Econ. Rpt.* 143. 20 pp., illus. Study reports the number, location, and size of communities without public water systems and without public sewage facilities. More than half the communities in the United States are without such facilities. The report summarizes the impact of Federal assistance programs in establishing needed facilities.

A Guide to Understanding the United States Department of Agriculture. 1968. *USDA Office of Personnel.* (37 pp.), illus. A simple explanation of the functions and organization of the Department for the information of foreign visitors, students, and similar groups.

Mechanical Seed Cleaning and Handling. BY JESSE E. HARMOND, N. ROBERT BRANDBURG, AND LEONARD M. KLEIN. 1968. *USDA Agr. Hbk.* 354. 56 pp., illus. \$0.55. Superseding *Agricultural Handbook* 179

of about the same title, this handbook is a guide to understanding, selecting, arranging, and operating seed processing equipment. It describes various types of seed cleaners and related machinery; discusses principles of separation for both commercial and experimental developments; and presents basic concepts of seed handling, storage, and plant layout.

22 Plants Poisonous to Livestock in the Western States. 1968. *USDA Agr. Inf. Bull.* 327. 64 pp., illus. \$0.45. Each plant is illustrated in color and briefly described with information on where and when it grows, its effect on livestock, symptoms of poisoning, and the way to reduce losses. The bulletin supersedes *Farmers' Bulletin* 2106, on the same subject.

Managing Grass-Shrub Cattle Ranges in the Southwest. BY HUDSON G. REYNOLDS AND S. CLARK MARTIN. 1968. *USDA Agr. Hbk.* 162 (Rev.). 44 pp., illus. \$0.20. Describes the grass-shrub type at the Santa Rita Experimental Range near Tucson, Ariz., and makes recommendations for managing such ranges, based on 40 years of experimental work there and observations throughout the Southwest.

The Golden Nematode Handbook. BY JOSEPH F. SPEARS. 1968. *USDA Agr. Hbk.* 353. 81 pp., illus. \$1.25. Survey, laboratory, control, and quarantine procedures.

Index to Volumes 1-20, Journal of Soil and Water Conservation (July 1946 to December 1965). *Soil Conservation Society of America, Ankeny, Iowa.* 72 pp. \$1.50.

Soil surveys

Westmoreland County, Pennsylvania. BY DAVID C. TAYLOR, NORMAN J. CHURCHILL, CRAIG K. LOSCHE, SAMUEL D. MENTZER, AND JAY B. WEAVER. 1968. 68 pp., illus.; maps 4 inches to the mile (1:15,840).

Worth County, Missouri. BY BURTON L. BROWN. 1968. 50 pp., illus.; maps 4 inches to the mile (1:15,840). Soils surveyed by Galen E. Kitzer, James P. Andrews, and Burton L. Brown.

Muskegon County, Michigan. BY KARL E. PREGITZER. 1968. 89 pp., illus.; maps 4 inches to the mile (1:15,840). Fieldwork by H. Buckley, D. Herst, R. D. Hall, L. R. Jones, T. J. Longwell, W. Myer, K. E. Pregitzer, and E. C. Sease.

Haskell County, Kansas. BY VERNON L. HAMILTON, DONALD R. JANTZ, MARION A. LOBMEYER, QUINTEN L. MARKLEY, AND WILLIAM R. SWAFFORD. 1968. 49 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Pierce County, Georgia. BY HOWARD T. STONER. 1968. 43 pp., illus.; maps 3.17 inches to the mile (1:20,000). Fieldwork by Howard T. Stoner, John H. Johnson, and D. Gray Aydelott.

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



America The Beautiful—Kansas

USDA SOIL CONSERVATION SERVICE

TERRACES PROTECT THE LAND, WINDBREAKS THE FARMSTEAD, SHERMAN COUNTY SOIL CONSERVATION DISTRICT

Full-color lithograph prints suitable for framing—one for each state, Puerto Rico, and Virgin Islands—are available from the Superintendent of Documents for \$0.10 each or \$5 for set of 52. Obtain order blanks from your local SCS or post office.

Help for wildlife on private land

The preservation and improvement of wildlife habitats on privately owned land has always been a major concern of the Soil Conservation Service. Today, as conservation concepts broaden with respect to a rapidly changing environment, it is ever more important to emphasize wildlife values in natural resource programs.

This importance grows from the realization that wildlife lives within the same environment and shares the same resources as people. The way land and water resources are used affects the different kinds of wildlife according to their various ecological relationships. Their environment is altered most where the human population is growing most rapidly.

In intensively farmed areas, wildlife is almost eliminated from the scene unless landowners give conscious attention to the basic requirements of food, cover, and water. It is to the credit of farmers that a high percentage of them do appreciate the presence of birdlife around their farmsteads and encourage game and other wildlife in their fields and pastures.

In nearly every community, a few landowners dedicate a part of their acreage to wildlife habitat and succeed in keeping good numbers of wild birds and mammals on their property. Some go so far as to produce wildlife as a crop, either for their own and their friends' enjoyment or as a part of an income-producing enterprise.

SCS soil conservationists are prepared to help conservation district cooperators plan a place for wildlife in their operations, and biologists are available for consultation on special problems. Conservation districts also help to bring the services of specialized wildlife agencies, both federal and state, to the attention of landowners and to arrange for planting materials and other aids to habitat improvement.

In recent years there has been widespread concern over the dwindling acreage of wetlands available for wildlife habitat. The Soil Conservation Service gives special attention to this problem in working with individual landowners. The soil conservationist interprets soil resource infor-

mation in terms of feasible alternative systems of land use and land treatment. If there are wetlands, he explains their use and management for wildlife. The fact that landowners frequently decide in favor of wildlife is shown by the record that in 1968, some 259,000 acres of wetland was set aside and maintained, and 81,000 acres was created or improved for wildlife.

The Agricultural Conservation Program administered by the Agricultural Stabilization and Conservation Service includes two practices that provide cost-sharing for the construction or restoration of water areas for wildlife. The Soil Conservation Service provides the landowner with the technical assistance necessary to establish these practices.

Another activity that benefits migratory waterfowl and other wildlife is the encouragement of landowners to build farm and ranch ponds. ACP cost-sharing and SCS technical assistance have helped construct more than 2 million such ponds that have increased the area of open water by well over 2 million acres. These ponds have brought permanent water to areas where none existed before. They account for a large percentage of the ducks now produced in the United States.

It is in the public interest that a maximum variety of wildlife species be preserved and maintained on privately owned land. As human population grows, the public demand for wildlife increases. Landowners are not always able to recognize and meet this demand without financial and technical assistance.

Assistance in developing conservation plans and applying conservation practices that build habitats and encourage wildlife are, therefore, an important function of SCS conservationists and soil conservation districts.

Kenneth E. Grant

If your address changes, please notify us of your complete new address, including Zip Code number, and include old address with our code number as shown above.

Irrigation water for New Mexico community

During the last 2 years, Community Ditch District Commissioners Bill Eldridge, Mariano Lucero, and Esquipula Garcia have helped their New Mexico community get a new diversion dam and structures to convey irrigation water across six arroyos.

Plans are being made to install additional structures and to realine parts of the community ditch.

It was Bill Eldridge who set the pattern for others to follow. He leveled his small 10-acre farm and installed a 700-foot concrete-lined irrigation ditch.

The leveling had to be a precision job because of the steep slopes and shallow soil. Soil Conservation Service specialists through the Jemez Soil and Water Conservation District designed and staked 13 graded benches and also the irrigation ditch with a turnout for each bench. Eldridge did his own leveling and hand-formed his own ditch lining.

Because of this work, irrigation water no longer turns the earthen ditch into an arroyo. The water no longer races across the slope. Instead, it runs into the benches through metal gates where it spreads evenly throughout the length of each border. A good job of irrigating can now be done in less than half the time it previously took to run water across the slope.

By next spring, Eldridge should have a good pasture from his recently planted fields, one of or-



Bill Eldridge (above, right) and helper make preparations to place hand-formed concrete in irrigation ditch. Below, Eldridge prepares land for planting irrigated pasture.



chardgrass and another of tall wheatgrass.

Bill Eldridge became a cooperator with the Jemez District in 1965. He is now chairman of the district

board of supervisors and chairman of the Canones Community Ditch Commission.—RICHARD L. BARBER, district conservationist, Bernalillo, N.Mex. ♦

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soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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Conservation on federal land

The Navy's woodland

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: A combination of conservation treatments in the Central Georgia Soil Conservation District produced this pleasant rural scene. The pasture in the background was once a cottonfield; the pond is one of six on the farm.

The big picture . . .

Soil and water conservation plays many roles in America's efforts to reshape her total environment.

Leading off this issue, our new administrator gives us a carefully considered statement of his view of SCS's place in the environmental picture and suggests some needed action (p. 195).

While recognizing that change is a natural corollary of conservation, he makes the point that SCS from the beginning has been concerned with quality of environment.

Backing his testimony are a variety of success stories:

A town in Alabama's Wiregrass RC&D Project carves a new life for itself with local initiative (p. 203). A Texas community, impatient for watershed help, pays the planning cost itself and reaps flood protection (p. 210). Mississippi citizens make a bayou beautiful again (p. 208).

A suburban New Jersey homeowner turns from erosion grief and expense to a dream-home landscape (p. 197). And a naval base in the same state rebuilds a 3,500-acre woodland after 50 years of fire damage (p. 201).

In Montana, agencies team up to check conservation needs on private and federal rangeland to cut erosion and sediment pollution (p. 199).

There's action, too, on cherry orchards in Michigan (p. 209); attracting birds (p. 212); an agricultural hall of fame (p. 206); and a pond-side recreation area (p. 216).

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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CLIFFORD M. HARDIN, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

BEN O. OSBORN, Editor

GEORGIE A. KELLER, Production Editor

Prepared in the Division of Information, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C. 20250

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From the Administrator:

To be of greater service

In a program as successful as soil and water conservation, we are often tempted to justify our present existence in terms of past accomplishment. This is a temptation we must resist. The record of the past, however splendid, is never more than soothing sirup in a tiresome convention speech; it is worthless currency in meeting the environmental problems that beset us at the close of the sixties. What counts is the present and where present actions are leading us.

Another pitfall we must avoid is the limited view of conservation as preservation of the environment with a "Do Not Touch" sign pinned to it. Truly nothing can be preserved, in the sense of leaving it unchanged. Conservation is a dynamic process, a process that both uses resources and renews them, like life itself. The true conservationist does not fear change; rather he attempts to predict the effects of change and to make sure that the process of change includes renewal as well as consumption.

It is with this kind of conservation—a conservation of renewal—that the Soil Conservation Service is most familiar. We have learned how to stop serious erosion on cropland. We have reduced the sediment load in lakes, rivers, and reservoirs. We have learned to control floods in small watersheds. We have cut down on duststorms; we have improved the environment for fish and wildlife. We have guided millions of people to more intelligent, more profitable use of land. We are experienced conservationists.

We have emerged from the experience of the last 35 years with five important assets, assets that can be of even greater value to the American people in the years ahead.

The first of these assets, and perhaps the most significant, is the soil conservation district movement. This movement took SCS out of the "demonstration project" phase and placed the initiative and responsibility for directing conservation programs in the hands of local people. It provided our agency with the means of providing technical assistance directly to land users. It continues to be a source of strength and leadership for the conservation movement today.

The second of these assets is a body of technical information on soil and water conservation that is unsurpassed anywhere in the world. We have extensive information on the soils of the United States and their uses and limitations. We have information on plant materials, wildlife, flood prevention — information assembled through long experience and painstaking effort. And we have learned to apply that information as conservation practices.

Our third asset includes several excellent legislative authorities, passed by Congress after long and careful study and consultation with land users from many parts of the country. They include the small watershed program, with its unsurpassed record of success; the Great Plains Conservation Program, a bold venture in long-term, planned cost sharing for a single region; and Resource Conservation and Development projects, which are creating a new enthusiasm for long-range, multicounty planning among local people. These are legislative instruments of proved worth, instruments which can be used much more widely than they have been used before.

A fourth asset is the people who have become a part of soil and water conservation. They are conservation district officials and cooperating land users. They are our own SCS career conservationists, engineers, and soil scientists, who are second to none in training and experience in the techniques of our field. The ranks of our employees will have to be enlarged if we are to meet the demands of the present and future.

We have a fifth asset that is often overlooked. This is a realistic way of looking at the job of conservation. SCS is a conservation agency working with the people who own and control America's private land, which is, after all, more than three-fifths of the land in this country. If these private land users have been sold on conservation, it is because SCS technicians have been able to offer them sound, practical techniques for better land use. For our part, SCS has learned that if the soil and water conservation job is going to be done, it will be done by these private land users or not at all.

We also know that conservation costs money. While we have been reaping the benefits of an amazing technology, we also have been paying a price for this technology in the form of a fouled environment. We know that we must pay a price to renew this environment, a price that most of us failed to anticipate and many are slow to acknowledge.

These then are our assets: the district movement, a large and growing body of knowledge about conservation, legislative authority to apply that knowledge, both volunteer and professional workers, and a practical attitude toward our job.

These are powerful assets which can be of enormous service to the American people. There is today a new surge of interest among our citizens in cleaning up our environment and in improving the quality of life for all our people. It is our task now, as never before, to bring our unique assets to bear on the large resource problems that loom before us.

—We must help seek solutions to America's water problems. Our water is becoming increasingly polluted. We do not have enough water to meet our needs in some places; in others, we occasionally have too much.

—We must step up efforts to reduce erosion and sediment, particularly in such critical

areas as developing suburbs, along streams and roads, and around strip mines.

—We must help more Americans, both urban and rural, to make use of the right land for the right purpose.

—We must extend the multiple benefits of the small watershed program to more communities.

—We must take leadership in creating more recreational opportunities for a growing population.

—We must help people, particularly in those rural areas which have not shared in the country's economic growth, to make better use of their natural resources to improve the quality of living. They need to find ways to use their resources to create more jobs, more income, and more community facilities, like schools, roads, hospitals.

—We must try to see America's resource problems, even as we chip away at parts of them, in the largest context possible.

The effort which is required of us will cost more money than is available to the soil and water conservation program today. It will require the services of more people than are employed by SCS today. It will take the voluntary efforts of more people than are active in the district movement today. It may require new legislation, and it will require additional nonfederal support.

But given the support we need, I have no doubt that we can continue to take leadership in a broad program of resource conservation. It is a task which we are uniquely equipped to handle. We can undertake it in a way, I am sure, which will strengthen the economy of rural America and make it a better place in which to live.

Kenneth E. Grant

We spent 5 years and a thousand dollars trying to stop a backyard erosion problem. Then, with the help of the Northeast Jersey Soil Conservation District, we solved the problem with a few bags of seed, some lime, and some fertilizer."

Gazing proudly over her Oradell, N.J., lawn, Mrs. Morrel O. Jones went on: "I just wish every suburban housewife could be spared the grief and hard work my husband and I had after we bought our home in 1960."

She recalled that dreary morning 2 years ago as she sat alone staring through her picture window. Today, of all days, her husband would have to be traveling in Connecticut.

It comes tumbling down

Through the rain-streaked pane she could see 5 years of work tumble before her eyes. Rocks rolled down the 35-foot hill, bounding across the backyard toward the window of her Bergen County home. Her sturdy wild rose bushes slipped past the railroad ties that braced the base of the

Why couldn't we have known sooner?...

Backyard conservation turns eroded slope into beauty spot

steep hill. Even the entangled honeysuckle vines gave way to the massive slide.

The New York City native could remember the happy day in 1960 when she and her husband moved to their own acre of land in Bergen County. Theirs was a beautiful brick home that sat on a hillside overlooking the Oradell meadows. Landscaping was the only thing needed for the final touch.

Visualizing a garden paradise, they eagerly and carefully set out all of the plants recommended by the landscape architects and "engineered" the hill as recommended.

When the 1961 spring thaw came they anticipated a green backdrop for their garden barbecues and outdoor parties. But as the rains continued, the new plants were uprooted. Once again, the sandy hillside was left naked.

Four years later as Mrs. Jones watched a similar onslaught, she made up her mind there would be a top-level breakfast conference with her husband.

After the lengthy breakfast session, Mr. Jones telephoned Rutgers State University in New Brunswick. On the University's recommendation, he visited the Bergen County agricultural agent. The agent, realizing the severity of the erosion problem, referred Mr. Jones to the Soil Conservation Service office in Morristown serving the Northeast Jersey Soil Conservation District.

The soil's the thing

It wasn't long after that when SCS Soil Conservationist Harold C. Waters parked in the driveway at 737 Hemlock Drive. He inspected the lot with Mrs. Jones and soon was explaining that the soil was sandy and, since it was located on a southern exposure, very droughty. He recommended two plants for the cure.

Weeping lovegrass, a plant native to Africa, should be seeded immediately to retard erosion. A European



Crownvetch and weeping lovegrass have healed the eroding backyard bank. Mrs. Morrel O. Jones and SCS Conservationist Harold C. Waters admire their handiwork.



A beauty spot now, the bank in 1966 (right) was a sorry backdrop for outdoor activities.

legume known as crownvetch should be seeded early in 1966.

The main idea behind the plan was to use a grass that would hold the bank until the aggressive crownvetch could take over. Lovegrass was selected for the job because it had proved to be more heat and drought resistant than most grasses.

To further assure results, Conservationist Waters recommended fertilizing and liming the bank. Five hun-

dred pounds of 10-10-10 fertilizer, a must item, and 300 pounds of ground lime were to be scattered over the dry soil before the lovegrass was seeded that summer.

The next step was to mulch the bank with saltgrass hay from the Jersey coast. To hold it in place, binder twine was criss-crossed over the hay and fastened down with wooden pegs.

And then the wait

When the New Year arrived, time was right to overseed the bank with crownvetch. The seed was inoculated with nitrogen-fixing bacteria. After the seed had been mixed with two buckets of sand, it was sown over the bank. All that was left to do now was wait.

Spring came and nothing seemed to have happened. After a few weeks, Mrs. Jones could not stand the suspense. She climbed the bank, untied a strand of binder twine and lifted the salt hay. At long last, there were tiny plants coming up everywhere.

It took more than a half-dozen years, but the Joneses finally have a lush green network of flowing hair-like grass mingling with the lacy legumes to complement their dream home. Adding to the beauty, the crownvetch is covered with pink blossoms throughout the summer. ♦

Agricultural production increase in 1968

Agricultural production in 1968 increased 2 to 3 percent, an increase equivalent to the long-term trend, in both developed and less developed areas of the world.

Because of differences in population growth, a gradual increase in output per person is implied in the developed countries but none in the less developed world.

During the past decade, Europe, the USSR, Japan, and Australia have made the largest per capita gains in agricultural output.

World production of grain expanded by about 20 percent in the past 3 years, following a very slow rate of growth during 1961-65. In 1967-68 rice led the advance in grain production, but in 1968-69 (as in 1966-67) wheat made the largest gain. The bulk of the world's wheat is grown in the developed countries, while rice is a primary grain in the less developed areas.

In most of the developed wheat-producing countries, good weather was the major factor accounting for the 1968-69 performance; in Australia, there was a sharp increase in wheat acreage in addition to good weather. ♦

Mrs. Jones and Conservationist Waters study a clump of weeping lovegrass.



Federally owned rangeland in Montana has similar conservation needs to private land and practices that need to be applied simultaneously on both for effective results. Most of the forest and woodland and the small acreage of cropland in federal ownership are generally adequately treated for conservation. These conclusions are drawn from two comparable inventories of soil and water conservation needs in Montana.

The inventory of federal land was initiated in 1968 at the request of Senator Lee Metcalf of Montana to determine the status of soil erosion and sediment damage occurring on or coming from public land.

Eight agencies report

Eight land-management agencies reviewed conditions on the areas under their jurisdiction. The Soil Conservation Service summarized the information and reviewed standards and specifications of the practices used by each agency for the prevention of erosion and sedimentation.

The inventory of privately owned land is part of the National Inventory of Soil and Water Conservation Needs currently being updated by SCS in cooperation with other agencies of the Department of Agriculture. The study of the federal land came at an opportune time to com-

Erosion on federal land

Comparative studies show public and private lands have similar needs

By A. B. Linford and E. C. Nielson

State conservationist and resource specialist, SCS, Bozeman, Mont.

pare land use and treatment needs under the two systems of ownership.

Agencies reporting on land under their administration in Montana are the Forest Service, 16.67 million acres; Bureau of Land Management, 3.23 million acres; Bureau of Indian Affairs, 0.12 million acres; Bureau of Sport Fisheries and Wildlife, 1.12 million acres; Bureau of Reclamation, 0.16 million acres; National Park Service, 1.16 million acres; Agricultural Research Service, 0.01 million acres; and U.S. Army Corps of Engineers, 0.61 million acres. The 28.13 million acres of federal land makes up about 30 percent of the state's land area.

The kinds of treatments needed on federal land closely parallel those needed on private land. The study indicates that federal agencies have adequate standards to meet conserva-

tion needs and to protect soil and water resources. Lack of funds to install needed practices limits progress in land treatment.

Erosion on farmland

Most soil erosion and sedimentation in Montana come from privately owned land used for cropland and associated farming purposes. Montana has 15,020,208 acres of cropland, of which only 31,438 acres is under federal ownership. About 62 percent of the private cropland and 20 percent of federally owned cropland needs conservation treatment.

The most widespread erosion and sedimentation problems are on range and pasture land, which makes up about 60 percent of the state's area—40 percent of the federal and 66 percent of the private land. Conservation treatments are needed in about the same degree on both public and private grazing land, the tabulations indicating 62 percent of federal range and 59 percent of private range needing treatment.

Approximately half of the federal land is forest and woodland, of which only 10 percent needs conservation treatment.

Privately owned woodland and cropland need conservation treatment to about the same degree as pasture and range.

Considering land in all uses, the studies show that about 42 percent of federal land and 60 percent of private land is in need of conservation treatment.

Most of the perennial streamflow in Montana originates on federally managed lands at the higher eleva-

The Dry Creek Irrigation Company protects a new headgate with riprapping on the East Gallatin River.



tions. For the most part, stream pollution from sedimentation does not become a serious problem until the waters have reached the privately owned lands adjacent to them.

The Soil Conservation Service estimates that about 80 percent of the

stream pollution from sediment and streambank erosion comes from private land and degrading stream channels, and 20 percent originates from federally managed lands.

Adequate streambank protection is one of the most costly features in an

erosion-control program. Methods of control must vary to meet the conditions and gradients of the stream. Assistance from state or federal sources is needed to reduce the stream load and keep sediment pollution at an acceptable level. ♦

Land Use and Treatment Needs

Major land use	Federally owned land		Privately owned land ¹	
	Total area Acres	Needing treatment Percent	Total area Acres	Needing treatment Percent
Cropland	31,438	20	14,988,770	62
Pasture and range	11,101,746	62	43,005,290	59
Woodland	14,173,694	10	7,003,910	61
Other	932,065	1	520,210	45
Primitive wilderness	1,892,700			
Total	28,130,720		65,518,180	

¹ Preliminary figures from Conservation Needs Inventory



An irrigation water diversion (above) washes a gully through rangeland. Former irrigated cropland (below) was devastated by a flood in June 1964.



TV station carries three conservation programs

Soil Conservation Service people have three different kinds of conservation programs on one station in Alexandria, La. The station is KALB-TV and reaches more than a million viewers in the central part of the state.

All three programs are designed to reach different audiences. One monthly program, 10 minutes long, is live and is part of a 30-minute afternoon show appealing to women. Another program is live each week at noon. It's designed for a rural audience, although other material is used for people with other interests. While the participants are at the station for the live noon program, a 5-minute tape is made for showing the next day on an early morning 1-hour variety program called "Jambalaya." Another audience sees this program.

About 20 SCS people from the area, plus some state office personnel, take part in the shows. TV people are well pleased and say ratings are good. ♦

Coon dog ponds

Farm ponds are used for many purposes, but SCS soil conservationists have recently added another to their list.

The Washington County Coon and Cat Club in New York has built a pond for use in holding field trials of coon dogs. SCS conservationists assisted with the design.

SCS also assisted in building a pond for the same purpose in the Monmouth County Soil Conservation District of New Jersey. ♦

When officers at the Naval Air Station at Lakehurst, N.J., began a woodland development plan on the base in 1963, fire protection was first on the agenda.

The site of one of the most famous fires of all times—the burning of the dirigible *Hindenburg* in 1937—the woodlands of the area themselves have suffered a half-century of devastating burning.

Increment cores taken from large pines indicate that since 1920 forest fires have been frequent. Large trees have been killed or severely stunted and areas of low twisted sprout pines have stood with hardly any change for 20 or 30 years. Many mature pines have been so badly set back that they haven't produced a cone in a decade.

The station's conservation plan, as a cooperator with the Ocean County Soil Conservation District, covers 3,500 acres of land not occupied by buildings and runways. It has as its objective the rebuilding of the forest into fully stocked stands of pine and oak on the uplands and cedar in the peat swamps.

Woodland improvement began

Naval air station stops forest fires and begins restoration of woodlands

By A. E. Newby

Station forester, Naval Air Station, Lakehurst, N. J.

with construction of 5 miles of interior access roads. An additional 45 miles of woodland trails were opened and graded. Culverts were installed, and 17 fire ponds were located through the woodland area. Firebreaks were cleared along the western and northern boundaries of the station and controlled burning carried out near them to reduce the accumulation of fuel.

With the fire protection phase of the plan established, station personnel turned attention to improving existing forest stands. Chemical injectors were used to eliminate less desirable trees on 913 acres that were well stocked. An aerial application of

herbicide solved the problem of overtopping hardwoods on an additional 577 acres.

How to convert the areas of stunted pine and scrub oak into stands of desirable trees was also a problem. A set of brush-clearing drums was located nearby, and the owner engaged to prepare the land for direct seeding to pine.

The brush cutter consists of two cylinders 7 feet long by 4 feet in diameter with 12 cutting blades on the surfaces of each. The cylinders can be filled with water to make the cutter weigh about 25,000 pounds. The two rollers are hitched in imperfect tandem so that instead of turning

A shortleaf pine seedling is 18 inches high 18 months after direct seeding. The site was prepared by cutting the brush with heavy drums pulled over the area twice. The bulldozer operator, Wade Calhoun, stands by the equipment with Commander James E. McPhillips, public works officer at the Naval Air Station.





Pure seed are broadcast directly onto the freshly disturbed site where scrub pine had been cut with heavy rollers and mashed into the soil.

freely they roll and slide with shearing and crushing actions on the brush.

Some 300 acres of stunted pine have been treated with the brush cutter. Each area is gone over twice with the second pass usually at right angles to the first. Trees and brush are chopped up and incorporated into the soil. Islands of cover are left at intervals for pheasant, quail, and other wildlife.

In January 1966, the first cleared areas were seeded to pitch and short-leaf pine at the rate of 60,000 seeds per acre broadcast with cyclone-type hand seeders. No attempt was made to cover the seed.

By August 1967, pitch pine seedlings were 10 inches tall and short-leaf pine 17 inches. Pitch pine seeded in March 1967 was 7 inches tall in 6 months.

The success of the first efforts at direct seeding led to the decision to treat all areas of stunted pine in this manner. Plans call for 100 acres a year to be drummed in the spring, followed by a second pass 8 weeks later. Seeding will be done the following January at a rate of 70,000 seeds per acre. The total cost of the treatment is \$25 to \$35 per acre.

State forestry personnel are

watching the young trees on the Naval Air Station with interest, for much state land is covered with stunted fire-damaged pine. Also, an adjoining military base is considering buying brush drums for use on former firing range areas. ♦

Conservation art spurs community interest

The combination of a dedicated district conservationist and a community-spirited art teacher has involved a whole community in southern Idaho in expressing conservation through the art medium.

Started as a trial project in 1962 by the Wood River Soil and Water Conservation District in Shoshone, Idaho, the contest has reached the point where it is affecting nearly all the citizens of the community.

In 1962 when the contest was proposed, Mont Johnson, chairman of the Wood River District, asked Mrs. Robert Gaskill how long she thought it would take to get young people interested in painting.

"About 10 years," replied Mrs. Gaskill. But in the second year, under her leadership, the District Art Com-

mittee counted more than 100 paintings when contest time rolled around with all ages represented.

A special prize was awarded in 1964 in the "pee-wee" division. The artist's age? Three years old.

The contest has received statewide publicity for its efforts. In 1966, Louise Shadduck, director of the Idaho Department of Commerce and Development, traveled to Shoshone to make the presentations at the annual awards dinner. She was so taken by some of the work that she purchased one of the paintings from an 11-year-old artist, Jay Gaskill.

What about the effect of the painting contest on the community? Cecil Cope, Shoshone SCS district conservationist, commented on this:

"There are several interesting facets to the art contest. One of these occurs regularly in Mrs. Gaskill's art classes. One painter will ask another, 'which painting is going to be your conservation picture?' 'What's a conservation picture?,' will be the reply. And then an explanation of conservation and what must go into a painting to qualify for the district's contest.

"The contest has also drawn in many nonfarm people as sponsors. In addition to the prizes awarded by the Wood River District, seven or eight local businesses sponsor awards in the farm divisions with prizes ranging from \$10 to \$35. The off-beat side of art is not forgotten, either. This year there will be a \$15 prize for the most unusual painted garbage can.

"It is not overestimating," Cope concluded, "to say that 500 people have learned more about conservation by being involved as parents, relatives, or friends of the artists, and the painters themselves. How many of these 500 have taught conservation through discussions of the artwork with their friends cannot be estimated."

Cecil Cope died a few days after making this statement.

The contest, renamed the Cecil Cope Art Contest, continues to function under the sponsorship of the Wood River District. ♦

Three years ago the people of Slocomb, Ala., (pop. 1,500) decided that the town had too many good resources that were not fully developed. They formed a Citizens Advisory Council to plan what they needed and to find the best way to get it.

Today, Slocomb has a new water system, well, and tank; a sewage disposal plant and lagoon; drainage channels that will control flooding and reclaim more than 220 acres within the town limits; and a new municipal building, bank building, telephone building, and voting house.

It has a plan for housing which in 7 years should put every family in town in a standard, livable home.

Two farmers' markets for fresh produce have been built, and industry has come to town.

Mayor Lawrence Harris, just beginning his second 4-year term, explains it: "What really happened was

Slocomb's master plan for resource development

By Karol Fleming

This article by a reporter for a newspaper in a neighboring town, the "Geneva Reaper," reflects the local recognition of the initiative of the Slocomb community in improving its total environment.

that we stopped and took a good look." The Town Council and I decided that as much as we liked Slocomb, we didn't like what it had become.

"We were tired of the town's water tank going dry twice a year. We were sick of raw sewage being dumped near town. We knew we needed in-

dustry, and we wanted to do something about the annual flooding of parts of town."

Mayor Harris gives a big share of the credit for Slocomb's progress to the Wiregrass Resource Conservation and Development Project and to the town's attorney, Ralph Paul of Geneva.

"We were lucky," the mayor said. "The Wiregrass RC&D Project was just organizing in a nine-county area in southeast Alabama. In Geneva County, it was under the sponsorship of the Geneva County Soil and Water Conservation District and the county commissioners. SCS District Conservationist Jimmy Holland and RC&D Project Coordinator Cameron Lyle have given us invaluable help in making and carrying out our plans."

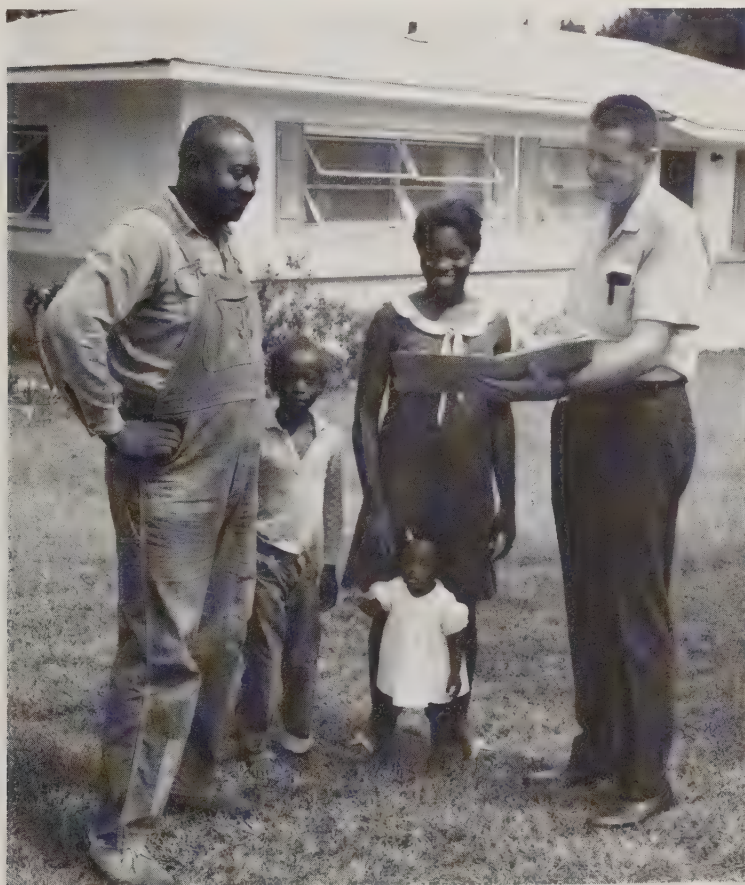
Mayor Harris emphasized the part played by the town's attorney. "We were fortunate in that we had a good attorney. With guidance from him we first of all organized the Citizens Advisory Council, a biracial committee, to study our needs."

This Citizens Advisory Council began meeting in October 1966. Since then it has met once a month. Attendance is nearly always 100 percent.

At the organizational meeting of this group in 1966, Attorney Paul explained to the town council and to the advisory group the need for an overall development plan.

Such a plan was made. The citizen's group worked with the Alabama Planning and Industrial Board to produce the master plan. Total cost of the survey was \$10,500. Of this amount, the town of Slocomb paid \$4,100. The balance was paid by a grant obtained through the Department of Housing and Urban Development.

Satisfaction with their new house shows in the faces of the Joe Murrey family of Slocomb as John Rea (right) explains the Farmers Home Administration loan plan that makes it possible.



Next, an engineering firm was hired to make a plan for the development of a water system, well, tank, and sewage system, and the construction of a municipal building.

The engineers' estimate? \$1 million.

Slocomb's citizens didn't see how they could raise that much money. But the town council had already acted to pass two ordinances, one establishing a Municipal Planning Commission and the other setting up modern building and housing codes. These ordinances, along with other required conditions, made the town eligible to receive federal aid, including additional help from the Department of Housing and Urban Development. A loan for \$514,000 was approved, and with this money the town started to work.

The town's master plan called for a water well first. It was so badly needed that often one neighbor had to ask another to turn off his water so he could get enough to "make the baby's formula." With the well came a 250,000-gallon storage tank and a water system for the whole town. The water system is now complete and in operation.

Municipal departments have moved into a new building, and a sewage lagoon is completed and in service. Collection pipes for the system are in service. Other parts will be added as funds are available.

While the sewer system was being installed, it became evident that something had to be done to correct flooding that affected about 30 percent of the area within the town limits in wet weather.

The flood problem in Slocomb was given top priority by the RC&D Steering Committee. Slocomb people obtained permits and easements for channels to drain the land and control the flooding. The Soil Conservation Service planned the needed stream channel improvements. The town of Slocomb let the contract for the work, using funds provided by the RC&D project. Construction is

now complete, and the town is already reaping the benefits.

The new channels, when complete, will control floods, move out stagnant water, eliminate mosquito- and fly-breeding places, and will reclaim valuable residential and commercial property.

With water control a reality, the town council and the advisory council set out to map a plan to upgrade housing, add new homes, and destroy old dilapidated houses. Their goal is to provide standard housing for every family in town within 7 years.

Part of the plan calls for assistance to individuals who are eligible for financial aid through the Federal Housing Administration or Veterans Administration. Other individuals will be helped to get loans from the Farmers Home Administration.

Low-income families will have space in low-rent housing. Fourteen low-rent housing units have already been completed, and approval for 20 more has been granted.

Businessmen saw that the business section of town needed cleaning up, too.

The Slocomb National Bank built a new \$100,000 building. General Telephone was encouraged to construct a \$30,000 equipment storage building. Geneva County was deeded property in the downtown area on which to build a town voting house.

A garment factory was brought to town but closed after a year's operation. The factory has since been sold to another firm that is expected to reopen within a few weeks. The new company will employ about 75 women.

The farmers in Slocomb commu-

Below, the Slocomb flood-control channel is under construction as Jimmy Chaffin, SCS engineering technician, and Richard Keith, SCS project engineer, check specifications. Above, Geneva County Growers, Inc., built the first farmers' market in Alabama under the Farmers Market Authority. Hulon Tew of the growers organization (left) discusses their promotion plans with Robert Reynolds, Geneva Extension chairman. Below, Mayor Lawrence Harris signs the agreement for the first RC&D-funded project measure. Looking on are Ralph Paul (left), town attorney, and James E. Holland, SCS district conservationist.





nity needed a market for their produce. They organized as the Geneva County Growers and took advantage of the services of the newly created State Marketing Authority Board.

The Authority built, at a cost of \$80,000, a facility to handle pink tomatoes, watermelons, and peas. In the first year of operation, total volume of the market was \$500,000. The second year volume reached \$600,000 for tomatoes and \$200,000 for watermelons and peas.

Then these farmers banded together to build a green tomato market. Under an organization called Slocomb Growers, Inc., they borrowed money from the Slocomb National Bank and raised additional funds among their own members to build a \$30,000 market. The first summer they handled \$150,000 worth of green tomatoes.

Slocomb has solved a lot of its problems, but Mayor Harris says a lot more need correcting.

"We're working with RC&D and some SCS help now to develop recreation for our town," the mayor said.

"Our city dump is an eyesore and a health hazard. On the advice of the RC&D project leaders, we've asked the State Department of Public Health for assistance in designing and recommending methods of constructing a sanitary fill," Mayor Harris said.

And the mayor of Slocomb is well aware that Slocomb has other problems yet to be solved. "But," says the mayor, "We feel that half the battle is won in that our Citizens Advisory Council and the town council are alert to the needs of our town. As problems arise we know that there is a place to go get help."

Mayor Harris and his town council are fully aware that the Wiregrass RC&D Project is not a source for all of the funds needed.

But they have found it to be a stockpile of experts ready to give advice in planning and carrying out programs to fully develop the community's natural resources for the benefit of the people. ♦





Agricultural Hall of Fame a conservation showcase

By F. DeWitt Abbott

State resource conservationist, SCS, Salina, Kans.

The Agricultural Hall of Fame and National Center, Bonner Springs, Kans., with its 275 acres under conservation land use and treatment, will provide visitors with an opportunity to view firsthand and at close range conservation practices on the land.

It is not unusual for more than 1,500 people to visit the center on summer weekends. Many of these people are from nearby cities, and many are from all over the United States.

Conservation is being featured on the land for several reasons: The land needs conservation treatment. Conservation fits in with the non-profit Agriculture Center's aim to exhibit the past, present, and future of agriculture and agribusiness, as provided in its Congressional charter, and it will give thousands of people a chance to observe conservation work.

With technical help from the Soil Conservation Service through the Wyandotte Soil Conservation District, the board of directors of the center has developed a conservation plan for the acreage involving a wide variety of conservation practices and treatments.

Some of the conservation work includes healing gullies with grassed waterways; building a multipurpose dam near the main exhibit hall to function as a small flood-detention and grade-stabilizing structure, a 2-acre pond for providing stockwater, a diversion channel to bring storm

runoff into the pond, and an access highway; and reserving a 114-acre smooth brome meadow for planned exhibit buildings.

Forty-five acres of cropland with waterways and graded parallel terraces will be used to grow adapted crops, such as corn, sorghum, soy-

BEFORE AND AFTER . . .

The 2-acre multipurpose reservoir at the Agriculture Center (above) is a result of applied conservation measures. Before the dam was built, the area was a deep wooded gully (below) with smaller gullies scarring the fields above it. The grassed waterway (at right) replaces a gully that was almost deep enough to hide SCS Conservationist Roger Coleman.



beans, wheat, and alfalfa-grass in rotation and on the contour.

A few head of domestic livestock will be kept on 24 acres of brome pasture where gullies will be smoothed and seeded, grazing regulated, land fertilized, and a field border of multiflora rose planted.

Other plans call for 12 acres of rangeland to have brush control, range seeding, and a grade-stabilizing structure; 27 acres to be in smooth brome for hay; a wooded area of 28 acres to have hiking trails, woodland management, and evergreens; trees

and shrubs along the trails labeled; and a pond in a 22-acre wildlife area rebuilt by deepening and reshaping the edges. It and the multipurpose pond will add to the scenic beauty of the Agriculture Center's grounds.

Also an acre below the wildlife dam will be planted to trees and shrubs for wildlife habitat; 2 to 5 acres will be kept in grass for nesting cover; a three-row windbreak will be planted near residential buildings; and several other measures applied for the encouragement of wildlife throughout the property.

The Agriculture Center directors are determined to set up an outstanding demonstration of conservation of soil and water. They realize how important it is to remind all who come that way of the need for land protection and wise use for a permanent and productive agriculture and national economy. ♦

Contour farming and beauty

Contour farming has long become a hallmark of soil conservation, a symbol of good husbandry, a creator of natural beauty, and a protector of the earth's great bounty.

Terraces and stripcropping on the contour are now an accepted technique for managing water that runs off farms and field. It is a way of intercepting surface water which, uncontrolled, would erode away hill-sides and send fertile soil down streams and rivers in times of floods.

Alternate strips of grain and grass following the contours of the landscape are subjects for the artist's canvas and at the same time protectors of the Nation's basic resource—protectors against soil erosion that robs land of its productivity, pollutes our streams with mud, and shortens the useful life of our reservoirs. ♦

Fishponds on the increase

While commercial fresh water fisheries in lakes and rivers have been declining during recent years, well-managed fishponds have been increasing.

Arkansas has been the national leader in this enterprise, particularly where several varieties of catfish are concerned. Other states with a significant amount of fish farming include Missouri, Kansas, Texas, Oklahoma, Mississippi, Alabama, Georgia, and the Carolinas.

Two major factors are helping to expand fish farming. The first factor is associated with the quality of fish produced, which tempts the palate of rural and urban people. Second, the cash returns from fish farming appeal to the farmer in his continuing quest for economic betterment. ♦



Delta town uses RC&D aid to beautify bayou

The bayou is very much a part of the life of the people of Inverness, Miss. When the Southeast Delta Resource Conservation and Development Project came into being, Inverness citizens saw in it an opportunity to advance their community efforts to beautify the bayou.

Like many delta towns, Inverness settled beside the bayou and used it for travel and transportation of goods. But, as elsewhere, when steamboats gave way to railroads the bayou grew up in weeds.

The beautification project at Inverness was started in 1948 as a memorial to those who served their country in World War II. The bayou was cleared of brush and its banks planted to grass. A magnolia tree was planted for each son who gave his life for his country.

Flowers were planted at the street intersection. A small dam was installed to maintain a constant water level in the bayou. There are benches where residents rest, feed the squirrels or ducks, or just relax and enjoy the surroundings.

The Inverness residents are proud of their accomplishments. As Mrs.

W. A. Price, president of the Garden Club, says: "We started with what we had and tried to do something for our town."

This cleanup job has been the cooperative effort of city officials, civic clubs, garden clubs, and property owners—all determined not to let their bayou become an eyesore and community liability. But, in the words of Mayor J. R. Bradley, they are "more concerned with what is possible in the future."

So the town submitted project proposals through the Sunflower County Soil Conservation District to the Southeast Delta RC&D Project to help clear up more of the bayou and to put in a sanitary area for garbage disposal.

These and other community improvement measures have been included in an RC&D project measure which has been approved by the RC&D steering committee. The Mississippi Highway Department and other state and federal agencies are assisting in carrying out the coordinated plan of beautification.

The highway department is already developing plans to beautify areas along Highway 49 West through town. Another half-mile of the bayou has been cleared and is ready for planting.

Inverness is making full use of its bayou as a reminder of its colorful and historic past.—C. H. WHITTINGTON, *RC&D project coordinator, SCS, Greenwood, Miss.* ♦



A planting of shrubs and flowers made by the Inverness garden club at a street intersection graces the banks of the bayou. Below, at left is a typical section of the unimproved bayou included in the RC&D project measure for beautification; at right, a part of the memorial park established by local organizations.





Land reshaping and big machines shake up the cherry business

By **Guy E. Springer and
Lavern C. Watson**

*District conservationist and area engineer,
SCS, Traverse City, Mich.*

Mechanization has begun to shake the cherry business in north-west Michigan. New \$12,000 machines now harvest the cherries that were once picked by nimble fingered people. A canvas funnel under the trees catches the ripe fruit as it falls, shaken out by a motor-driven arm.

Progress is not without its problems, however. Orchardists in the Grand Traverse Bay area planted many of their productive orchards 8 to 10 years ago on slopes steeper than 12 percent. These steep and irregular fields were no problem for ladders and people, but mechanical pickers and other high-priced machinery don't work too well in the close spacing and short turns.

No alternative

Land reshaping is solving the problem and bringing other benefits as a bonus. Growers are cutting and

A smooth moderate slope supports a young cherry orchard that is practical for mechanical tillage and harvest after reshaping of the steep irregular terrain. The lower photograph was made in 1958, the upper in 1968.



filling slopes of up to 30 percent in steepness, following designs prepared by the Soil Conservation Service assisting the Grand Traverse Soil Conservation District.

The cost may be as much as \$200 an acre, and production for 10 years is sacrificed while the new orchard grows to maturity. But there seems to be no alternative; orchardists can't buy additional land nearby. Reshaping pays in the long run, however, because it solves several problems at the same time.

Erosion must be controlled on reshaped fields, and attention to air drainage is necessary. Conservation technicians survey air channels where necessary and design and stake the waterways when they lay out the fields for reshaping. The earthmoving contractor then does the whole remodeling job at one time.

Then the land must be covered.

Disturbed areas are chiseled or subsoiled 16 inches deep in furrows 6 to 8 feet apart. Soil tests tell the owner what fertilizer or amendments are needed to establish a good stand of grass. Waterways are shaped and seeded and the whole field planted to an adapted grass along with a nurse crop. If thinly clad areas show up later, they are reseeded, mulched, and fertilized.

Trees are planted as soon as erosion is under control. Subsoiling continues, usually after each rain. Weeds and grass in the tree rows are controlled with chemicals.

Difficulties and advantages

Still other difficulties may arise from reshaping, even after the trees begin to grow. Grading sometimes exposes subsoils that have a high calcium carbonate content, and the surface becomes platy. This reduces in-



The mechanical cherry picker shakes the fruit onto a canvas that funnels the cherries onto a conveyor.

filtration of water and aeration of the soil. As trees begin to mature, deficiencies of minor elements may appear as a result of the high calcium carbonate content of the soil. Trees

on deep cut areas may tend to wilt during prolonged drought. Usually these problems can be overcome by good soil management.

The advantages of land shaping

more than outweigh problems, however. Reducing slopes to 12 percent or less with smooth curves makes machine work easier and more economical. And improved air drainage results in proper blossoming and disease control.

Neighbors in some communities are pooling their efforts and cutting air channels through woodlands, across steep ridges, or into old orchards. Flowing air pushes the frost line deeper into the depressions. One orchardist reclaimed 35 acres of frost-affected land by buying 2 acres of old orchard and cutting a 100-foot-wide channel through it. He lowered the frost line 15 feet vertically into a low area.

Orchardists in Michigan's Traverse Bay area are keeping pace with the changing times by applying new techniques, skills, management, and equipment. Land reshaping, erosion control, and air drainage practices are a part of these new skills. ♦

Texas community uses bond issue funds to speed up watershed planning

By W. L. Smith

Conservation agronomist, SCS, Temple, Tex.

G F. Wimberly and his neighbors were impatient to start planning the East Keechi Watershed Project in Texas—impatient enough to pay for it themselves.

In 1958, they stepped out of the waiting line for federal SCS watershed planning assistance and voted a bond issue to pay with local funds the estimated cost of an SCS planning party. By 1967, the last of 10 flood-prevention dams was completed, but, according to Wimberly, it wasn't as easy as it sounds.

"In April 1957, we had an unusually heavy rain and East Keechi flooded over 4,000 acres of bottom

land," Wimberly says. "Around \$65,000 of damage was done to farmland, roads, buildings, and fences. This really got us to thinking about a flood-prevention project."



Heavy damage, caused by flooding in April 1957, made citizens anxious to start a flood-prevention project.

With this flood and 23 other major ones since 1926 still fresh in their minds, Wimberly and his neighbors went to work. A hearing with representatives of the Texas Water Commission registered great interest and need for the project and a water control and improvement district was approved. The district was organized and became the East Keechi Water Control and Improvement District No. 1. The East Keechi watershed



G. F. Wimberly, remembering past floods, discovers the fruits of his labor as he looks at floodwaters held by a flood-prevention dam.

covers about 100 square miles in Palo Pinto, Jack, and Parker counties.

"We found after the district was organized that it would be several years before we could obtain a work plan from the Soil Conservation Service because of the backlog of watershed applications ahead of us, unless we paid for the planning," Wimberly said. "We then decided to put the proposition to a vote by the landowners."

An election was held March 1, 1958, for the landowners to vote on two propositions:

(1) For the issuance of bonds and the levying of a tax in payment thereof. The proceeds of the bond issue were to be used to pay the estimated cost of an SCS planning party.

(2) For a maintenance tax to be levied for the repair and maintenance of the works of improvement.

Both propositions carried by a 2 to 1 majority.

After the bond issue was voted, the work plan was developed, and in 1960 the water control district signed a work plan agreement with SCS. The district paid for the development of the plan, furnished easements and rights-of-way, and administered the construction contracts.

Construction was started in 1963, and the last structure was completed in 1967. The 10 structures will retard 13,496 acre-feet of water, enough to reduce flood damages by 79 percent.

The earthen dams, spillways, and dikes of the structures were planted to coastal bermudagrass, King Ranch bluestem, and sideoats grama to protect the slopes from erosion. All sites were fenced to facilitate management of the grass.

The East Keechi Water Control and Improvement District No. 1 now has full operation and maintenance responsibility for the project. Their representatives inspect the sites after each storm, or annually, to determine maintenance needs. ♦

States and territories directly help conservation districts

The 50 states and Puerto Rico and the Virgin Islands have appropriated a total of \$31,686,016 for the fiscal year 1969 participation in the soil conservation district programs. Some of these appropriations are: \$4,867,389 for direct assistance to soil conservation districts; \$15,752,989 for investigations and planning and works of improvement in the watershed program. ♦

Research grant to aid microclimate studies

Studies of the moisture balance and aerodynamic characteristics of microclimates surrounding vegetative surfaces will be made by Israeli scientists of the Volcani Institute of Agricultural Research under a 3-year grant of about \$62,329 awarded by the U.S. Department of Agriculture.

Purpose of this work is to obtain a comprehensive set of reliable measurements which can be computerized to evaluate land use.

The Israelis will make 24-hour measurements with mobile instruments at selected sites five or six times during a given season. Data will be obtained on such environmental factors as heat transfer by wind, aerodynamic turbulence, and radiation from sun, sky, and plants.

The data will be analyzed to determine management practices that will make the most efficient use of radiant energy and of moisture in relation to various surface conditions.

This grant will be paid for with currency obtained by the United States through sales of farm products to Israel. ♦

Small watersheds

The work in subwatersheds of the 11 authorized river basin flood-control projects and the pilot watershed projects of SCS has been successful not only because of its flood-prevention and watershed protection benefits. It has shown how to handle floodwaters on small watersheds effectively and at low cost. It has served as a training ground for technical personnel. It has served as a proving ground for techniques being applied in the Public Law 566 program.

Trespass laws for farmers

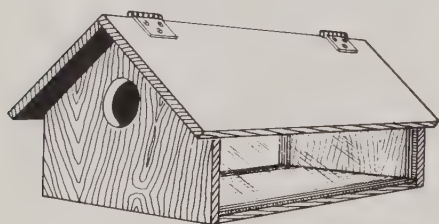
Today's farmer has more legal backing in the control of trespass than he had 40 years ago. Laws are more restrictive on the sportsman and are more widely publicized. Enforcement of trespass laws is much improved. ♦

Choose the birds you want to feed

We can attract and support selected kinds of birds around our homes by using interesting combinations of choice foods in different kinds of feeders—whether we live on farms, ranches, or in suburbia.

Two examples illustrate the point.

A gable-type house feeder, with 1-1/2-inch entrance holes at each end, permits the feeding of hole-nesting birds, excluding all of the species that are unaccustomed to entering bird-



houses or holes in trees or posts. The one illustrated is used exclusively by bluebirds when we feed small fruits, raisins, or dried currants.

The sides of the feeder are glass, so we can watch the birds feeding. The expense of these fruits is not great for a few bluebirds; but flocks of robins and other fruit eaters would consume large amounts. Further, mockingbirds usually drive bluebirds away from fruits that are fed in the open, or grow on shrubs and trees, but they do not guard the house-type feeder.

When we change the food to sunflower seeds, peanut butter, or nut meats, chickadees, nuthatches, and titmice feed there eagerly, but bluebirds do not like such foods. So if you want both types of birds, feed them in separate feeders of the same design. If you live in western states where house finches are numerous and fond of sunflower seeds, you can keep them out of the feeder by

making the holes smaller—1 1/4-inch diameter.

Swinging feeders, as illustrated, attract cardinals, finches, chickadees, nuthatches, titmice, mockingbirds, tanagers, and thrashers to sunflower seeds, peanut butter, and other foods that each one likes. Only an occa-



sional house sparrow or jay ventures to use these free-swinging and quick-turning feeders—which is a relief to anyone who tires of feeding such species.—VERNE E. DAVISON, *regional biologist, SCS, Portland, Oreg.* ♦

Illustrations from *Attracting Birds; From the Prairies to the Atlantic*, by permission of the publisher, Thomas Y. Crowell Company.

Pesticide buildup in soil varies

Analyses of thousands of soil samples from all parts of the country during the past 4 years show that the rate of breakdown and disappearance of agricultural chemicals in soil varies, reports Dr. Paul F. Sand of USDA's Agricultural Research Service.

An expanded soil monitoring program was initiated in 1968 to get information on residues in soil from cropland and noncropland areas in the United States. In cooperation

with other government agencies and landowners, a plan has been developed to sample some 15,000 sites throughout the United States. A pesticide history will be obtained for each site so scientists will know what has been put on the soil.

"Soils in many orchards contain more pesticide residues than soils used to grow vegetables, cotton, corn, or forests," Dr. Sand said. "Residues in orchard soils consist mainly of the more persistent chlorinated hydrocarbon insecticides. These residues are not absorbed by the fruit trees. If such orchards are taken out of production, caution must be used in selecting crops to be planted in these soils.

"We tested for two herbicides, 2,4-D and trifluralin, widely used to control weeds," Dr. Sand reported, "and we could find only traces of 2,4-D in a few soil samples. Trifluralin, at very low concentrations, was found in some soybean and cotton soils.

"Of the insecticides, we found DDT and its isomers in most crop areas and in some forest areas. Based on 3 years of study, where DDT was not used during the year, the residues decreased." ♦

Humid East needs to conserve water

In the humid East, an apparent abundance of water led to complacency until recently when two factors created concern over the water supply. First, the periods of drought from 1961 to 1966 in the Northeast affected crop production and depleted the surface and ground-water supplies.

Second, attention was called to the rapid increases in the rates of pollution of these waters resulting from increased urban and industrial expansion. As a result, there is an increasing awareness of the need for conserving both the quantity and quality of the Nation's water supplies. ♦

Audubon Society to discuss man and nature

Man and Nature in Mid-America" will open a discussion of national conservation issues at the 64th National Audubon Convention to be held April 25-29 in St. Louis, Mo. The new president, Dr. Elvis J. Starr, will address the group.

A major attraction on the opening day will be a program explaining new approaches to environmental education for big-city children. Other sessions will be devoted to reports on endangered species of wildlife, state programs for nongame wildlife, and the progress of the fight against the use of DDT and other long-lasting pesticides.

The convention is timed to coincide with the spring bird migration along the Mississippi flyway, and there will be field trips to wildlife refuges and other points of interest to conservationists.

Academy of Sciences concentrates on urban problems

The annual meeting of the National Academy of Sciences in Washington, D.C., April 28-30, will be open to the public.

Among the several symposiums is one on urban problems on April 30 under the chairmanship of William Gorham of the Urban Institute in Washington.

Congress on Irrigation and Drainage meets in Mexico

The Seventh International Congress on Irrigation and Drainage will take place in Mexico City under the auspices of Gustavo Diaz Ordaz, President of Mexico, April 9-20. The Congress will be followed by three simultaneous technical tours, each lasting 5 days.

Four subjects will be studied

during the Congress: (1) Water requirements of crops; (2) hydraulic structures on small channels; (3) methods and economics of operation and maintenance of drainage systems in agricultural areas; and (4) development of irrigable lands on a new irrigation scheme or irrigation project.

The International Congress on Irrigation and Drainage is composed of members from 58 countries.

Planning officials hold short courses

Themes as diverse as the many contemporary challenges to planners will engage the 1969 American Society of Planning Officials' National Planning Conference, April 19-24, in Cincinnati, Ohio.

Discussions will consider the interplay of competing social and environmental values; the new balance of planning power emerging among levels of government and involving new forms of citizen participation; and the development of sharper tools for planning.

As a new element in the conference format, there will be four "short courses," each a series of sessions, probing one subject and running throughout the conference. The subjects are land use regulations; social planning; new federal legislation; and planning-program-budgeting systems.

Dates and places

April 9-20, International Congress on Irrigation and Drainage, Mexico City, Mexico.

19-24, American Society of Planning Officials, Cincinnati, Ohio.

22-23, American Forest Products Industries, San Francisco, Calif.

23-24, Industrial Forestry Association, Portland, Oreg.

25-29, National Audubon Society, St. Louis, Mo.

28-30, National Academy of Sciences, Washington, D. C.

28-May 2, League of Women Voters, Council Meeting, Washington, D. C.

28-May 2, American Institute, New Orleans, La.

30-May 1, International Land, Pasture, and Range Judging Contest, Oklahoma City, Okla.

May

1-2, Southern Forestry Conference, Hot Springs, Ark.

1-2, American Concrete Pipe Association, Technical Conference, Denver, Colo.

4-7, Association of American State Geologists, Tucson, Ariz.

8-14, National Council of State Garden Clubs, Inc., Dallas, Tex.

11-14, National Forest Products Association, Washington, D. C.

11-18, Soil Stewardship Week

13-16, National Rivers and Harbors Congress, Washington, D. C.

18-23, Urban Land Institute, Miami, Florida.

19-22, American Water Works Association, San Diego, Calif. ♦

Outdoor recreation

USDA estimates that outdoor recreation to be provided in 124 watershed projects developed by local communities in 33 states with assistance of the Department will attract more than 10 million users a year.

Facilities for swimming, boating, water skiing, picnicking, hiking, and other outdoor recreation will be combined with other purposes in and around 145 lakes being built as part of these projects. Other purposes include flood prevention, agricultural water management, rural and municipal water supply, low-flow augmentation, and fish and wildlife development.

More than 60 percent of the lakes will provide between 100 and 1,750 surface acres of water.

The estimated cost of the 145 recreation developments will be \$31.2 million in federal money and \$40.8 million from local sources. ♦

Lowlands occupied by communities

As towns grow and as rural areas are settled, they often wake up to find that overnight they have lost precious reaches of land along valley bottoms. Sometimes it is a subdivision which cuts up a tree-bordered channel. More often it is scattered houses or industrial plants which take over the lowlands. ♦

Review



Urban and Rural America: Policies for Future Growth. 1968. *Advisory Commission on Intergovernmental Relations. Washington, D. C. 186 pp. \$1.25.*

The Advisory Commission on Intergovernmental Relations is charged by law to give continuing attention to problems that affect cooperation among the different levels of government. Such a subject concerns recent trends in the geographic location of urbanization and economic development in the United States.

In this report, the commission examines urbanization trends with special reference to the problems of those areas adversely affected by these developments.

"To describe the United States as an urban Nation is to state the obvious," says the commission. And urbanization, it points out, involves tremendous changes in rural America. The heavy outmigration from the farms is well known. Not so well understood is the connection between the decline of rural areas and the problems of congestion and deterioration in the cities.

The policy implication of this report seems to be that the various levels of government and the private sector should consider the desirability of trying to slow the growth of metropolitan complexes by attracting more economic activity to rural areas and to small cities and towns.

The commission recommends measures for influencing industrial location and population movement, for encouraging and guiding new community and other large-scale development, and for equipping state and local governments to deal with urban growth. It urges:

- (1) Development of a national policy to deal with urban growth.
- (2) A re-examination of multistate regional planning areas and agencies.
- (3) A new and expanding role for

state governments through the development of state urban development plans.

Collaboration with the private sector of the national economy is, of course, essential.

The report is an excellent reference for those concerned about community development.—NORMAN A. BERG, *associate administrator, SCS.*

The Role of Potassium in Agriculture. EDITED BY V. J. KILMER, S. E. YOUNTS, AND N. C. BRADY. 1968. *American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America. Madison, Wis. 109 pp., illus. \$7.50.*

This book consists of a set of 22 papers by 27 authorities, presented at a symposium sponsored by the publishers, the Tennessee Valley Authority and the American Potash Institute. The editors say that it is directed to extension workers, farm managers, college and high school teachers, and many others with interests in potassium and its use in fertilizer.

The papers cover a wide range of topics relative to the mining and use of the world's potassium resources. The reader who has been out of school for a few years is apt to find many of the papers difficult or unin-

telligible. The language is technical, and few of us understand all the technical terms in such a wide array of disciplines. Nevertheless, even though few can follow all of the discussions, nearly all will find much of interest and value.—GUY D. SMITH, *director, Soil Survey Investigation Division, SCS.*

The Last Landscape. BY WILLIAM H. WHYTE. 1968. *Doubleday & Company, Inc. New York. 378 pp. \$6.95.*

At a time when most front-line observers of metropolitan growth look to the future with despair, William H. Whyte develops a thesis of optimism. He believes that future metropolitan landscapes could look better for the same reason many observers think they will look worse—because more people will be living in them.

His optimism is based on a faith in public outrage, that people will get mad enough to defend our vital open spaces from ultimate desecration when they see haphazard development threatening the last of our landscapes.

This faith is tempered by a frank appraisal of what has been accomplished thus far by legal devices, long-range planning, new towns, and other attempts to preserve open space and improve developed space. The book maintains a realistic outlook, emphasizing that, "land-use decisions must be made now," in the midst of political and economic pressures and that future metropolitan growth is being shaped by these immediate decisions.

"We are going to have to work with a much tighter pattern of spaces and development, and our environment may be the better for it," Whyte suggests. To accomplish this, he advocates building clustered developments with interspersed open spaces and using natural resource patterns (hills, valleys, and drainageways) to preserve and link open spaces where people would most commonly see and use them.

He admits there is a population



"The nicest people visit me!" KAB-7

problem, but, he says, "It is forcing us to do out of necessity what we would not do earlier. For years we wasted land with impunity. Now we no longer can."—DUANE BALTZ, *Information Division, SCS, Washington, D.C.*

Providing Quality Environment in Our Communities. EDITED BY WARD W. KONKLE. 1968. *Graduate School Press, USDA, Washington, D. C.* 150 pp. \$5.25; cloth \$3.00.

In 1965 and again in 1967 the Graduate School of the U.S. Department of Agriculture focused attention on the growing problems of man's environment through its public lecture series.

The considered statements of distinguished authorities and the responses of "reactors" presented in the two symposiums undoubtedly helped arouse the concern of government agency people dealing with these matters.

The book, *Providing Quality Environment in Our Communities*, is the record of the lectures and discussions of the second symposium.

The principal topics and speakers were: "Cities for Man," by Kenneth B. Clark, professor of psychology of the City College of New York; "Rural Communities," by Philip H. Hoff, then governor of Vermont; "Balance of Nature," by Barry Commoner, chairman of the Botany Department of Washington University, St. Louis; "Of Urban and Rural Forces," by C. A. Doxiadis, president of an urban planning firm in Washington, D.C.; and "Rural Renaissance," by Orville L. Freeman, then Secretary of Agriculture.

Each of the lectures is an especially concise summary of the contributions of the speaker to the thinking on the subject.—B.O.

New publications

Even-Aged Silviculture for Upland Central Hardwoods. BY BENJAMIN A. ROACH AND SAMUEL F. GINGRICH. 1968. *USDA Agr.*

Hbk. 355. 39 pp., illus. \$0.50. A guide to silvicultural research on upland hardwoods in the eastern and midwestern states. This handbook brings together the results of more than 20 years of research and experience, both public and private, in the culture of upland hardwood stands and is an elaboration and expansion of the "Timber Management Guide for Upland Central Hardwoods" issued in December 1962 and revised through 1965.

Compilation of Statutes Relating to Soil Conservation, Acreage Diversion, Marketing Quotas and Allotments, Wheat Certificates, Commodity Credit Corporation, Price Support, Export and Surplus Removal, Public Law 480, Crop Insurance, Sugar Payments and Quotas, Marketing Agreements and Orders, School Lunch, Child Nutrition, Food Stamp, and Related Statutes as of January 1, 1969. 1969. *USDA Agr. Hbk.* 361. 384 pp. \$1.50. Compiled under the direction of the General Counsel.

Common Aquatic Weeds. BY L. W. WELDON AND R. D. BLACKBURN. 1969

USDA Agr. Hbk. 352. 43 pp., illus. \$0.50. Compiled to serve as a basis for the identification of the more common aquatic plants, classified in five groups: Free-floating plants, aquatic grasses, emerged plants, submerged plants, and algae.

Response of Ironweed and Buckbrush to Herbicides and to Herbicides in Combinations With Mowing, Nitrogen Fertilizer, and Surfactants. BY ELROY J. PETERS AND J. F. STRITZKE. 1969. *USDA Tech. Bull.* 1400. 16 pp., illus. \$0.15. Current status of research on the control of ironweed and buckbrush.

Handbook of Agricultural Charts 1968. 1968. *USDA Agr. Hbk.* 359. 48 pp. \$0.65. Updated catalog of charts available from the Department of Agriculture with tables of data.

Color Filmstrips and Slide Sets of the United States Department of Agriculture. 1968. *USDA Misc. Publ.* 1107. 13 pp. Super-sedes Agriculture Handbook 222 on the same subject.

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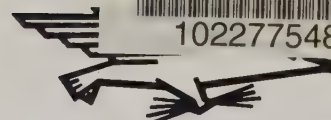
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Rogers Lake scores as a recreation enterprise

Before expanding his farm pond into an income-producing recreation area, Walter Rogers, Anadarko, Okla., took time to get used to having paying visitors on the farm.

He started his Rogers' Lake business slowly. Now it is a thriving family enterprise providing a place to swim, fish, and picnic for all ages.

Rogers got into the outdoor recreation business as a sideline to his livestock operations when, with technical assistance from SCS and cost sharing from the Agricultural Stabilization and Conservation Service, he built a farm pond for livestock water in 1958. For the first 3 years only a few people came to the pond and paid the access fee.

Rogers says the business began to grow when a soft drink company offered to put up signs to advertise his recreation area. Before, all the advertising was by word of mouth. After the signs were up, attendance went as high as 500 people one weekend. During this time, he installed dressing rooms, restrooms, picnic tables, and rafts made of oil barrels fastened together.

"Our recreation development has worked out well," Rogers says, and he feels his 3-acre lake fills a definite need for outdoor recreation in his community. "The people seem to enjoy our smaller place over some of the larger lakes," Rogers says.—ANTHONY P. OTTINGER, *district conservationist, SCS, Anadarko, Okla.* ♦



Recreation facilities offered by Rogers Lake (above). Larry Edwards (right, below) gets information on access fee from Mrs. Walter Rogers.



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COVER: Water from the snows of Mt. Hood, in the distant background, is subject to competing uses in the intensively farmed Hood River Valley, Oregon.

Comprehensive . . .

"Comprehensive" is the byword of today's water-resource planning.

The philosophy that has evolved in USDA's experience with river basin surveys has taken hold in state and local governments and gained support in other agencies of specialized interests. It calls for thorough appraisal of all water and water-related land resources and for consideration of the needs of all affected people in any water-planning effort.

At the invitation of River Basin Director Eugene Buie, two widely separated state officials join with local SCS representatives in describing for us this month the comprehensive planning currently under way in Oregon (p. 220) and Ohio (p. 230).

Watershed environment: Deputy Administrator Hollis Williams in our lead article relates today's burning interest in quality of environment with watershed protection.

Most pollutants are carried by running water, or by soil particles in running water. It follows that the watershed approach, basic to controlling running water, is also a sound basis for controlling pollution.

Economic development: The first extensive watershed-treatment and flood-prevention project to be completed—the Washita—has been in effect long enough to demonstrate its impact on local economic development. District conservationist Tom Perryman contributes an appraisal of results (p. 223).

soil conservation

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CLIFFORD M. HARDIN, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

BEN O. OSBORN, Editor

GEORGIE A. KELLER, Production Editor

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Agriculture and water quality

By Hollis R. Williams

Deputy administrator for watersheds, SCS

In the allotted "three score years and ten" of a man's lifetime, we have seen the open spaces, the clear flowing streams, and other facets of our natural environment in America slip away while we watched.

Since 1900—all in one lifetime—our streams have become polluted with heavy loads of silt, and many of them have become dumping grounds for garbage and filth.

Agriculture, rightly and wrongly, has been blamed for a substantial amount of water pollution. We say rightly and wrongly because agriculture does contribute to pollution, but in our search for the sources of our ills some of agriculture's contributions have been magnified out of all proportion.

Sediment, the product of erosion, and a plague to civilization throughout history, is a major pollutant of our flowing streams, lakes, and estuaries. Sediment transported by runoff water greatly exceeds in volume the combined total of all other substances that pollute surface waters. Because of the great areas involved, runoff from agricultural land carries the greatest amount of sediment.

But sediment is not just a farm problem. Surface mining, highway construction, and unstable roadbanks also produce much sediment. A substantial amount comes from eroding streambanks. And suburbia is an increasingly large contributor.

It has been estimated, for example, that about 25 percent of the sediment going into the lower estuary of the Potomac River comes from construction sites in the metropolitan Washington area. Some studies in Maryland show that land undergoing urban development produces from two to 200 times the amount of sediment that nearby farmland does. Unless steps are taken to control it, nonfarm erosion will become more widespread and serious in the future.

The list of the adverse effects of sediment on our environment and costs to our economy is long and need not be enumerated here. It is estimated that more than 380 million cubic yards of sediment is dredged

from the Nation's harbors and waterways each year. This is only one cost; the list includes loss in storage capacity in reservoirs; damage to pumps, turbines, and other equipment; increased cost of water purification; damage to aquatic life; and loss of recreational opportunities. The greatest cost of all, perhaps, is the loss from its original location of valuable topsoil that makes up a large part of the sediment burden.

Most of the other pollution resulting from agricultural activities enters flowing streams through runoff from the land. Many of the polluting materials are carried along attached to sediment particles resulting from erosion of farmland. Measures that control runoff and reduce erosion, therefore, tend to reduce the volume of other pollutants.

We already use an estimated 32 million tons of fertilizer annually in the United States. The amount will surely increase if we are to feed an estimated 7 billion people in the world within the next 3 decades. Unfortunately, fertilizers also cause a variety of water-pollution problems. For example, phosphorus and nitrogen washed or leached from the soil where applied help to induce the growth of algae in streams and reservoirs.

High crop yields depend on concentrations of closely spaced, highly fertilized, genetically selected strains of plants that are fast growing and high producing. As could be expected, such concentrations also encourage like concentrations of diseases and insects. To meet this threat to economical production, the organic pesticides were developed. These chemical tools have made a tremendous contribution to man's health and welfare over the past 25 years. They have been abused and misused in some instances with serious effects on the quality of water in streams and lakes.

Animals concentrated in barnyards and feedlots generate large quantities of wastes. Runoff from these areas can carry plant nutrients and infectious agents. It also carries organic materials which substantially increase the biochemical oxygen demand and rapidly de-

pletes the life-giving oxygen in streams.

How can pollution from agricultural sources be reduced? Several actions are essential:

First, we need to give greater attention to pollution control in watershed and river basin planning.

Pollution is a watershed problem, and its solution requires action on a watershed or river basin basis. We can give greater consideration in watershed treatment to the control of high-sediment-source areas, such as major gullies, roadbanks, or strip-mined areas. Storage for water-quality management can be included in reservoir plans.

Better erosion control

We need also to raise our standards in erosion control. We need land-treatment measures on more acres of land, and we need better treatment on some of the land currently being treated.

We need to apply additional techniques for the disposal of farm wastes. Lagoons, settling basins, and diversions for spreading liquid wastes are examples of the kinds of measures that could be used. But it takes trained people to plan these things.

Second, we need to accelerate research. We need to develop additional practical methods to control the various types of pollution from farm and ranch lands. The term "practical" means the kind of measures that can be installed without putting the operator out of business.

Technical assistance

Third, we need a sound national program of technical assistance to private individuals and to state and local units of government and other local public bodies in developing and carrying out plans for pollution abatement.

Fourth, we need some financial assistance in installing special measures for pollution control. Long-term credit and cost-sharing assistance should be included in current programs of the Department of Ag-

riculture to be used for this purpose.

Fifth, we need adequate institutional systems for carrying out an effective pollution abatement program. Foremost among potential leaders are existing soil and water conservation districts. Water-conservation districts, counties, municipalities, and a host of other self-governing organizations can help to carry out an effective program of water-pollution control in cooperation with state governments.

We must move ahead at once. How?

We can raise our sights to do a better job of erosion control now. More and better land treatment and associated structural measures can be applied under existing programs.

We have a technical staff available to help plan and apply those measures already known to be effective in pollution control. Some training is needed for competence in new techniques, and additional help is needed to accelerate the installation of proven measures now.

To provide adequate financial assistance, it would probably be necessary to obtain minor amendments to existing legislation. Some of the needed measures for pollution control, however, may very well be authorized under existing legislation.

Technical and research

As for additional research, we have active and competent research organizations in the Department of Agriculture—the Agricultural Research Service and the Forest Service. They are doing research in sediment control and pollution abatement now, but the pace could be stepped up.

We know that our natural environment is deteriorating and we know that agriculture is in a position to improve it. It seems obvious that we need to take more positive action. We have the leadership; we have the institutional systems; and we have the programs upon which to build. All we need to do is light the fuse. ♦

River basin studies

for better water
use planning

**By Donel J. Lane and
Herbert E. Carnahan**

*Director, Oregon Water Resources
Board, and party leader,
River Basin Staff, SCS, Salem, Oreg.*

A series of river basin investigations underway in Oregon seek answers to three difficult questions—how much unappropriated water is there in the state, who will get to use it, and how it will be used?

The Oregon Legislative Assembly in 1955 posed these questions when it directed the State Water Resources Board to allocate or classify all unappropriated surface water to meet future needs of the state.

The basic question that had to be answered first was how much unappropriated water there was in the state. To get the answer, the board initiated investigations on three drainage basins—the Rogue, Grande Ronde, and Umpqua—in 1957 and added other studies later.

Preceding each basin investigation, the county courts were asked to form water-resource committees



Farmlands of the Hood River Valley depend on water from mountain snows.

representing all water uses. These committees were asked to work closely with the board's staff and report their findings at hearings in each basin under investigation. After staff study of the resulting information, the board holds a second hearing to present proposed conclusions to residents of the basin and others who might be affected. After allowing additional time for comments, the board then adopts a formal program for the use of the unappropriated water of the basin.

These actions have the effect of law in that no utilization of the designated waters can be made that is contrary to the policy adopted by the board. The law requires that full consideration be given to all beneficial uses identified by statute; namely, domestic, municipal, irrigation, power development, industrial,

mining, recreation, wildlife and fish life, and pollution abatement.

The board's responsibilities

Additional responsibilities assigned to the board include:

(1) Rendering decisions in conflicts over the use of water in accordance with legislative standards.

(2) Carrying out state participation in federal flood-control projects.

(3) Reviewing federal projects to conform with state water policy.

(4) Devising means and methods of conserving, augmenting, and beneficially developing the water resources of the state.

(5) Identifying flood plains and sites of future reservoirs.

(6) Undertaking studies to determine Oregon's future water requirements for all beneficial uses.

(7) Participating in an ex-officio capacity or by specific legislative assignment in the development, formulation, or operation of interstate water compacts.

(8) Coordinating state activities related to comprehensive river basin planning.

In addition to the initial studies of the Rogue, Grande Ronde, and Umpqua basins, the board in 1957 also began investigations on specific reaches of the Snake and McKenzie rivers. The board was assisted in these studies by several state and federal agencies with responsibilities related to water resources.

Cooperative investigations

Since agriculture is a major use of water in Oregon, the U. S. Department of Agriculture was invited to participate. In 1959 a coopera-

tive agreement was developed and a work plan adopted under provisions of Section 6 of the Watershed Protection and Flood Prevention Act (Public Law 566). Three agencies of the Department are directly involved: The Soil Conservation Service, Forest Service, and Economic Research Service.

The original cooperative agreement with the Department of Agriculture covered the Upper Willamette and the Deschutes river basins. Since then 12 additional basins have been added. The joint studies result in more complete reports than either agency could develop separately with existing resources.

The nature of the basin studies has become increasingly more comprehensive. The early studies followed the board's basic approach to the problems outlined in the following steps:

- (1) Determine the amount and distribution of water in the basin.

- (2) Determine the amount and distribution of water under appropriation in the basin.

- (3) Determine the amount and distribution of water under the board's jurisdiction.

- (4) Determine existing and future needs for water in the basin.

- (5) Determine the relationship between available water and existing and future needs.

- (6) Determine, insofar as practicable, relative values of conflicting uses of the water.

- (7) Set forth ways in which the basin's water resources can be augmented, conserved, or managed to satisfy present and future needs.

- (8) Establish a program of water use and control consistent with the principle of beneficial use for the best interests of the people of Oregon.

As the work progressed the need for more detailed studies became apparent. In conjunction with the reconnaissance (type IV) basin studies, the board has participated in special investigations in cooperation with other state agencies, county courts, and consulting engi-

neers to obtain information on domestic and municipal water requirements, ground-water supplies, and flood-plain identification.

One special cooperative study identified some 200,000 acres of dry land in eastern Oregon that is suitable for irrigation development. Details of the study included delineation of soils suitable for irrigation, determination of suitable crops and water requirements, designing a skeleton irrigation distribution system, and working up economic data based on various cropping patterns and levels of management.

Detailed feasibility studies of specific projects are made through other government agency programs or by consulting engineers. They are not part of the river basin investigations.

These studies are extremely important in planning for the ultimate development of the water and related land resources of the state. They have already indicated that during certain times of the year nearly every stream is either over-

appropriated or so severely depleted that the flow is inadequate to meet current needs.

The state's economic well-being is inseparable from and directly related to its water resources, because much of its industry is based on the processing of agricultural or forest crops. Oregon's growing reputation as an outdoor recreation center also demands that its water resources be protected and developed.

Through the cooperative and coordinated studies, potential water-development projects have been identified, and local interest in them has been generated. Local concern has stimulated the organization of three soil and water conservation districts. It also has initiated more detailed studies by local groups seeking to reduce flood and sedimentation damages and to make more beneficial use of water resources. Applications for assistance in developing watershed and RC&D projects have stemmed directly from river basin studies. ♦

National Sediment Control Conference to study methods for critical areas

A National Conference on Sediment Control will be held in Washington, D. C., September 14-16, to bring together the best thinking of county and municipal officials and conservationists on ways to stabilize sediment source areas.

Sponsors include the National Association of Counties, National Association of Soil and Water Conservation Districts, and the Soil Conservation Society of America. Cooperating are the Departments of Agriculture, Housing and Urban Development, and Interior.

Official attendance will be limited to some 200 persons, including 100 selected from among the Nation's county officials, 50 from soil conservation districts, and 50 from state, regional, and federal agencies. Objective of the meeting will be "to develop effective community action

programs for control of sediment in areas of critical soil erosion."

"Loss of soil and the resulting sedimentation of waterways and reservoirs is becoming an increasingly serious problem on nonfarm land," says Carl J. Johnson, conference chairman; "particularly in developing suburban areas, along roads and streams, and in surface mining areas. County officials, when they learn to recognize the causes of erosion and techniques for dealing with them, can be key people in sediment control programs."

He added that one task of the conferees will be to help develop a comprehensive guidebook on sediment control for county officials. The Department of the Interior has authorized a grant of funds to the Association of County Governments to be applied to publication costs. ♦



Taming the wild Washita

In Roger Mills County, Okla., one of the Nation's original 11 flood-prevention projects is taming the Washita River and bringing the people new economic strength after decades of droughts and flooding.

In the "dirty 30's" the county ranked among the state's lowest in per capita income. A U. S. Department of Agriculture study in 1936 estimated losses from flooding on the Washita River at \$2,300,000; if projected on today's prices, the figure would be staggering.

Yet, in 1968 Roger Mills County was the state's number one milk producer with an annual milk check

of more than \$2¾ million. Other assets include 90 dairy farms, 160 irrigation systems, 6,000 dairy cattle, and about 50,000 beef cattle. Feed stores, dairy equipment dealerships, and other retailers are thriving byproducts of the agricultural industry.

Bank deposits in the county have gone up from \$100,000 in 1945 to more than \$6 million. All around the county you can see new homes, new trucks and cars, and young men who have gone to college and returned to the county to farm.

Much of the impetus for this economic turnabout came from the

A flood prevention project harnesses water resources to a growing economy

By Thomas E. Perryman

District conservationist, SCS, Cheyenne, Okla.

Above, modern irrigation systems on land protected from flooding give stability to the economy.

Below, a 4th of July crowd finds plenty of water for boating on an Upper Washita lake.



Washita Flood Prevention Project. The combined effect of a series of subwatershed projects started primarily to stop devastating floods is to return thousands of acres of rich river bottom land to production and to store water for crops, towns, industries, and recreation. It is hard to realize that the fertile fields along the Washita River once lay idle, covered with brush so thick that even native grass could not grow.

Roger Mills County was once the home of the Plains Indian. Then came the cowman followed by the pioneer farmer with his plow and sod home. When the dense buffalo-grass and lush bluestem were plowed up for wheat and other crops, Mother Nature's wall-to-wall carpet was ripped loose, leaving the soil exposed to erosion and setting the stage for floods and blowing dust.

Dark days

During the Dust Bowl days of the 1930's farmers mortgaged all they had to keep their families together. Good managers diversified. A weekly income from cream, eggs, and milk kept the bills paid and helped many a family stay on the land.

Mrs. Klina Casady and her husband, the late John Casady, were owners and publishers of the *Cheyenne Star* for many years. They promoted conservation and flood-prevention projects in every issue.

"I remember those Dust Bowl days," says Mrs. Casady. "Our county looked like the Sahara Desert. And I remember the floods, too. When we had the floods we didn't have anything. Everybody left the county except those who were determined to stay."

New dawn

"When we began work on the Sandstone Creek Project, our people seemed to get a vision," Mrs. Casady said. The Sandstone Creek Watershed Project, completed in 1953, was the first of its kind in the Nation.

The people of Roger Mills County were not only burdened by the economic problems of the depression years, but they also had to endure the roiling, muddy floods of the Washita. For decades the river had taken an annual toll in lost crops, damaged roads and bridges, drowned livestock, and scoured-away topsoil.

In 1934 a sudden rise claimed 17 lives in the Hammon area of Roger Mills County. Many people were plucked from trees and house-tops in hair-breadth escapes from the raging stream. The discouraged people were ready to give up with an attitude of "you can't hold back the river."

In 1944 Congress authorized the Secretary of Agriculture to undertake watershed-protection and flood-prevention programs on 11 watersheds in the United States. Federal leadership for the projects was assigned to the Soil Conservation Service. The Washita was selected as one of the 11. The first flood-detention dam was dedicated in 1948.

Conservation applied

Now, 75 percent of the landowners in the Washita watershed have soil and water conservation plans. Diversification has replaced the old one-crop system, and native grasses help to absorb runoff. More than 840 flood-detention dams up and down the Washita and its tributaries capture and control excess runoff. At least 151 of those dams are in nine subwatersheds in Roger Mills County. Accelerated soil and water-conservation programs have changed the face of the uplands. Gullies have been shaped and seeded, grass planted, and terraces and waterways built.

Drive through Roger Mills County today and you see intensive farming on the bottom lands. Roger Mills County dairymen produce more on fewer acres than ever before. They have fine new dairy barns, new hay trucks, and modern irrigation systems. Herd quality is

being constantly improved. None of this could have happened if the bottom land had not been protected from floods.

Successful farming

L. W. Minor and his son, Ivan, are successful dairy farmers. They are typical of some 50 father-son or father-son-in-law teams in the county. Ivan was graduated at Oklahoma State University in 1964 and joined his father in a farming partnership.

"If it was like it used to be before we got the flood-control dams, we couldn't make a thing," says Minor. Pointing to an alfalfa field on his farm, he said, "I've seen water go over this field 13 times in one spring—that was back in 1935 and '37. I was trying to grow wheat and cotton."

Minor and his son own 160 acres of land and lease 480 acres more. His best land is in the Washita River bottom. They have 65 head of production cows and about the same number of heifers.

"We don't have any trouble from flooding now, but we couldn't farm our best land if we didn't have those watershed structures above us," he says.

More productive land

Minor has cleared about 40 acres of undesirable trees and brush and plans to clear some more. He has about 100 acres under irrigation now, mostly alfalfa and some sorghum. He rarely needs to buy feed for his cattle.

"With a dairy you've got to have a supply of quality hay," says Minor. He gets five good cuttings of alfalfa each year. Irrigation helps to hold the stand.

L. L. Males, president of the Security State Bank, Cheyenne, and member of the Upper Washita Soil and Water Conservation District board of supervisors, has been an enthusiastic supporter of watershed projects over the years.

"We have made agriculture our industry in Roger Mills County,"



Flood prevention on the Washita River and its tributaries has increased the certainty of the area's wheat harvest.

Males says. "When we first began we didn't dream of reclaiming land and irrigating crops but just wanted to stop the disastrous floods."

The land that has not been reclaimed for crops has been reseeded with native grasses and Midland bermudagrass and turned into rich pastures for both beef and dairy herds.

Recreation benefits

Besides the direct benefits resulting from farming the reclaimed land, there have been many side results.

"When we started the watershed project we didn't think about the recreational value of flood-control reservoirs," Males says. "But since that time the public has found many of the lakes quite suitable for fishing, hunting, swimming, water skiing, and picnicking."

Another valuable asset of the

watershed program has been in the saving in tax dollars, Males explains. County roads and bridges that once were washed away or had to be repaired several times a year are no longer damaged by floodwaters. That has meant that the county has had more money to improve the roads in the county.

Site 4, Sergeant Major Creek Watershed Project, provides incidental municipal water for Cheyenne. It was built as a flood-prevention reservoir with a sediment pool and therefore was paid for by the federal government. The city paid \$70,000 for the land and later paid \$105,000 for a water-treatment plant. So the city got a 120- to 130-acre flood-control lake that doubles as a water supply for about \$175,000.

Undoubtedly, there would have been some growth without the watershed program, but it provided

the impetus that has changed the area almost beyond recognition in a few short years. ♦

Water outlook for West is good

Ample water supplies for next summer for most of the Western United States are forecast but heavy low-elevation snow in many areas could cause high water damage this spring.

"The water supply outlook is satisfactory or better for most areas of the West," says William G. Shannon, chief, Water Supply Forecasting Branch, SCS, Washington, D. C.

The forecasts, based on snow surveys, are used in planning for irrigation, domestic and municipal water use, and hydro-electric power generation, and in the regulation of reservoir storage and streamflow. ♦

A snow survey crew arrives by "snowcat" at an SCS electric telemetry data collection station in the mountains near Lake Tahoe, Calif.



Snow survey helps to measure the effects of Project "Sky Water"

By Donald W. McAndrew

Snow survey supervisor, SCS, Reno, Nev.

Among the many uses of snow survey data collected under the direction of the Soil Conservation Service is one to help evaluate the effectiveness of weather modification experiments in the Bureau of Reclamation's Atmospheric Water Resource Program.

SCS has just installed 15 new snow courses in the Jemez and San Pedro Mountains of northern New Mexico, a target area of project "Sky Water." This is one of several areas in the West where weather modification studies are in progress.

Man has long dreamed of influencing the clouds, altering storms, and adding rain and snow to keep rivers flowing and reservoirs full. More snow in the mountains would mean additional water for irrigation, as well as a more dependable water supply for the city dweller's lawn and drinking glass. Factories, power dams, and virtually every water user would benefit.

The primary emphasis in project "Sky Water" is studying the effect

of man's endeavors to artificially increase precipitation. A thorough evaluation of the results is of primary importance. The Soil Conservation Service cooperates in the project by gathering snow and rain data in the study area to be used by the Bureau of Reclamation to help assess the productivity of the cloud-seeding efforts.

The snow courses are permanently established areas located in high mountain meadows not subject to freak drifts. Each course consists of 10 sample points spaced at equal distances across an open area. The course is surveyed and marked so the sample points can be accurately located at any time. At each snow course site a special shielded precipitation gage is also installed.

After each snow in the "Sky Water" study area, two snow surveyors go into the high mountains to measure the depth and moisture content of the snow at each sample point on all 15 courses. From early December until the spring thaw,

these men will take hundreds of snow readings in this study.

Snow surveyors always work in pairs for safety and for efficiency in sampling snow. The team keeping watch on the "Sky Water" snow courses are part of a corps of several hundred SCS employees and cooperators throughout the western states and Alaska who measure and report on more than 1,500 snow courses. In 1968 they recorded more than 5,600 snow course measurements and 950 aerial snow marker readings that were the basis for 2,162 water-supply forecasts for 426 river stations.

The resulting information, released to storage regulation agencies, irrigators, and other water users—weeks to months in advance of the actual runoff from the melting snow—permits advance planning for use of available supplies and forewarns of impending floods.

Most measurements are made by hand, as in the "Sky Water" study area, with a sampling tube and scale for determining by weight the water content of the snow. New types of equipment that collect data automatically and transmit them by radio to base stations are in use by SCS in selected segments of the snow course network in the West. This permits more frequent information about current status of snow and related factors on the mountains. ♦

What does a man do?...

- ... when the only land that is dry enough to farm is on the side of an eroding hill?
- ... when year after year, the trickling stream that winds through his valley suddenly becomes a raging torrent destroying his small fields of corn and tobacco and leaving behind a sea of mud and debris?
- ... when sediment and pollution fill his stream, choking fish and wildlife?
- ... when there is not enough water for his livestock or his crops?

What does a man do?

Near Salyersville in eastern Kentucky's Magoffin County, neighbors along Burning Fork—a tributary of the Licking River—have done much in the past 3 years.

Forty-seven of them have cleared debris and brush from 6.9 miles of the Burning Fork channel, reducing the threat of floods.

Nineteen have built ponds for livestock water and five for recreation.

Ten farmers have installed 36,850 feet of drainage tile, allowing crops to be moved from the eroding hillsides to the valley floor, much of which had been too wet to grow anything.

Six have planted 21 acres of pine seedlings, and 46 have established 581 acres of pasture and meadows.

Timber stand improvement has been completed on 56 acres, 2,200 feet of diversion ditches have been built, along with six grassed waterways—the list goes on.

These accomplishments may sound small when compared to a big farming operation, but these are small farmers in an area with big problems.

And it was precisely because of these small farmers that a new program was developed. The Appalachian Land Stabilization and Conservation Program (ALSCP) offers to people of the Appalachian states a higher rate of cost-sharing (up to 80 percent) for installing long-range conservation and development plans on their land than is available under the regular Agricultural Conservation Program (ACP).

The farmers who live along Burning Fork have long been aware of their conservation problems, but



Land stabilization in Burning Fork Valley

solutions were out of their reach. Even the usual 50-50 cost-sharing of ACP was of little use to them because of the difficulty of matching the Government's funds.

Assistance to landowners in land stabilization and conservation is authorized by the Appalachian Regional Development Act of 1965. The act is administered through the Appalachian Regional Commission, composed of one federal member appointed by the President, and one member from each of the 13 participating states in the region.

Each state is responsible for recommending local and state projects

within its borders to receive assistance under the act. The local people along Burning Fork decided what the problems of the area were and what they wanted to accomplish with such a project. These included developing public and private recreation and the fish and wildlife potential of the area; accelerated land treatment to control erosion and reduce flooding and sedimentation; roadside erosion control and beautification; stream channel improvement to reduce flood damage; reforestation and fire control; prevention of stream pollution; increased farm income; and the de-

velopment of utility rights-of-way for wildlife food and cover.

Long before the people of Burning Fork submitted their project for approval, excellent groundwork had been laid by the supervisors of the Magoffin County Soil and Water Conservation District. J. D. Arnett, chairman, and Marcus Mann, vice chairman, had conducted meetings with the leaders of Magoffin County's Development Association, the fiscal court, farm bureau, sportsman club, women's club, and various USDA agencies and farm leaders from all across the area.

The district supervisors provided the legwork in following up on the meetings by personally contacting the farmers involved.

By the time their project proposal was approved by the Appalachian Regional Commission, 50 farmers were ready to make requests for conservation and development plans on their land. Now, 3 years later, 77 farms are participating in the Burning Fork Project, designating more than 1,241 acres for conservation treatment.

Hurl Scott, district cooperator, expressed the feeling of most farmers in the Burning Fork Valley. He said, "It is the most wonderful program that ever came to the county. Farmers have applied practices that will save their soil and increase their income. They have developed fine pasture, meadow, and recreation facilities that could not have been done without the 80 percent cost-share."

Two USDA agencies, the Soil Conservation Service and the Agricultural Stabilization and Conservation Service (ASCS), worked with district and other leaders in helping to find solutions to the area's conservation problems.

They also personally contacted many of the leaders of the area and helped with group meetings with farmers to explain the benefits of the program. As many as 50 people attended each of these meetings.

After the program was approved in 1966, the SCS District Conservationist William J. Cantrell as-



Debris clogged most of the Burning Fork streambed before the project began. Above, Magoffin County ASCS Chairman Wardie Patrick (in checked shirt) and SCS Conservationist W. J. Cantrell study the problem together. Upper center, Patrick walks the length of a diversion with the farmer, Roland Conley. Lower center, tobacco has been moved from the eroding hillside in background to a bottom-land field as a result of the water-control work.

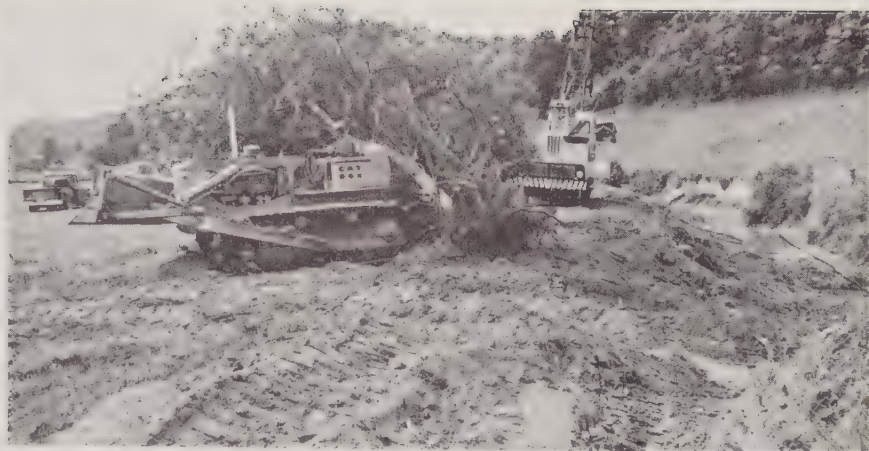
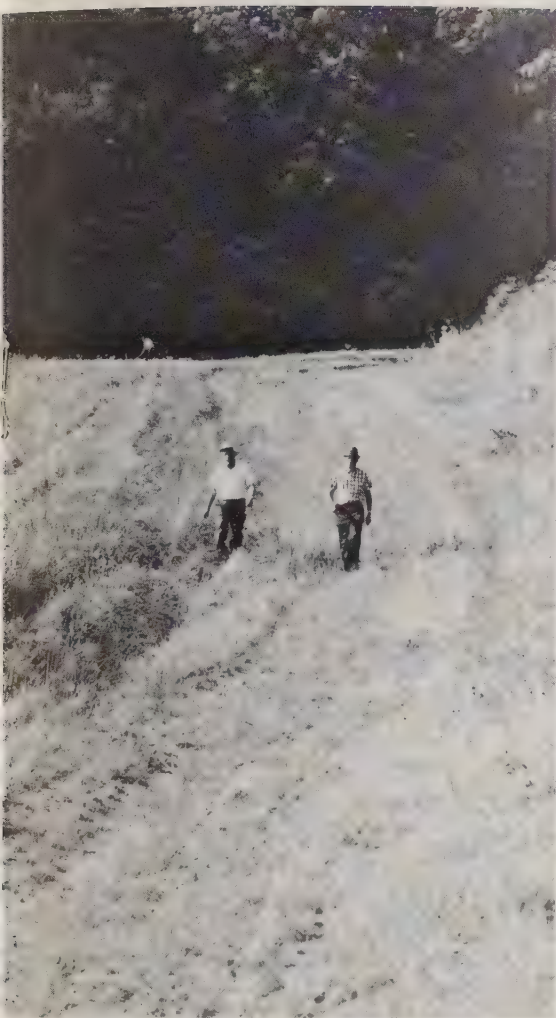
sisted each participating farmer in preparing a conservation and development plan for his farm. The plan outlined the needs and the solutions for each individual farm.

The County ASCS Committee then approved applications for federal cost-sharing on eligible practices in the plans. When ALSCP funds were not available for tree-planting requests, the committee

approved ACP funds for this use. They also approved ACP funds for tile drainage, a practice not included in the original ALSCP plan.

Yes, the economic prospects of Burning Fork appear brighter today. The land looks more prosperous, the creek less menacing.

What does a man do? Along Burning Fork he has already done a great deal. ♦



More than 5 miles of stream improvement work (above) was completed in the Burning Fork Appalachian Project. Vegetation soon healed the banks of the reshaped channel. Below, ponds provide new recreation opportunities as well as livestock and irrigation water. Mr. and Mrs. Charles Preston enjoy a quiet moment by their new impoundment.

Ohio's regional water-resource plans

By A. F. Woldorf and Jesse L. Hicks

Coordinator of regional water planning, Ohio Department of Natural Resources, and assistant state conservationist, SCS, Columbus, Ohio

A regional approach to state water-resource planning is the Ohio Water Commission's answer to a charge from the Governor in 1965 to draft policy and programs for comprehensive water management for the entire state.

A 100-man citizens' advisory council formulated the broad provisions of a state plan to be supported in detail by five regional plans covering the five principal drainage areas in the state.

Ohio's regional plans, now well on the way to completion, are really compendiums of many plans produced by many agencies with common goals and guidelines.

Broad policy guidance for planning is provided by a regional advisory council composed of representatives of the agencies or interests at federal, state, and local levels that normally would plan, construct, or use water projects in the region. This includes industrialists, legislators, farm leaders, and sportsmen as well as government representatives. General chairmanship for the planning is provided by the Ohio Department of Natural Resources.

It is the state's general philosophy

that the agency or interest most directly involved in carrying out a particular phase of the water program should plan it. Thus, the State Water Pollution Control Board determines stream water-quality standards, the U. S. Army Corps of Engineers locates and designs major flood-control structures, the Soil Conservation Service helps plan and carry out small watershed projects, and the Ohio Division of Parks and Recreation leads in recreation planning.

Just being completed is a state-sponsored series of river basin water-inventory reports which provide many of the facts about the economy and the water availability, problems, and uses in each area. Demographic and economic data of many areas have already been compiled by regional planning commis-

sions in cooperation with federal agencies.

Of great value in the Ohio River drainage area covering three-fifths of Ohio is the newly drafted Ohio River Basin Study (type I). The Great Lakes Basin Study (type I), now in progress, will provide similar framework information for the remaining part of the state.

The Muskingum River Basin Study (type IV), also underway, will provide detailed information on specific projects and will be a major source of input into the Southeast Ohio Water Development plan.

A comprehensive water plan for northwest Ohio was completed in April 1967, and the program is now being implemented. Seven major reservoirs are in some phase of construction or advanced negotiation as joint city-state projects for

Wolf Run Lake is a multiple-purpose multiple-agency project. The 220-acre reservoir provides storage for recreation, water supply, and flood prevention. It was constructed through the cooperative efforts of the Ohio Department of Natural Resources, Noble Soil and Water Conservation District, Duck Creek Subdistrict of the Muskingum Watershed Conservancy District, and the Soil Conservation Service.





Above-ground or "upground" reservoirs are being constructed in the flat prairie section of Ohio where natural impoundment sites are lacking. This 75-acre irrigation reservoir in the Marsh Run Watershed Project is filled by pumping from Marsh Run during periods of storm runoff.

public water supply, irrigation, and streamflow improvement. More than 20 automatic water-quality stream monitors are being installed as a joint federal-state program. Sixteen industries and nine cities have installed or enlarged waste-treatment facilities to meet tough stream water-quality standards.

To control floods and erosion and achieve needed drainage of farmland and urban areas, the northwest Ohio comprehensive plan calls for almost complete coverage of the 8,000-square-mile area with watershed projects under Public Law 566. Already, 26 applications for assistance covering more than 3 million acres have been received. Preliminary investigation reports are complete or underway for 11 of the watersheds. Work plans have been completed for five areas, and four projects are authorized for construction. All structural and land-treatment measures have been completed in one watershed project.

Preliminary findings of the revised Conservation Needs Inventory show that out of 309 upstream watersheds in Ohio 163 have significant problems and are in need of project development. Long-range schedules for planning and carrying out these projects will be integrated

into the overall program to meet the needs of the people in each region. Above-ground reservoirs for multipurpose use are being planned in the flatland areas where suitable natural reservoir sites are not available. A 75-acre reservoir of this type including provision for irrigation was recently completed in the Marsh Run Watershed Project. Similar reservoirs built for water supply and recreation in this area demonstrate the need and value of this type of structure.

Recreation development in upstream watershed projects will be coordinated with the statewide recreational plan for Ohio. Developments similar to the Wolf Run Reservoir in the West Fork of Duck Creek Watershed are being studied. This 200-acre multipurpose reservoir for water supply, recreation, and flood control is an excellent example of local, state, and federal teamwork. Recreation facilities developed around the lake include tent and trailer sites, picnic areas, a bathing beach, and boat dock.

Related land resources are also an important part of the watershed studies. Reduction of sediment into Lake Erie and other streams and lakes of the state is a major objective of all water-resource plans. ♦

My conservation experiences

By Lee A. Nesom

Soil conservation technician, SCS, Clinton, La.

The day I started to work on the Pretty Creek Watershed Project, conservation, to me, was just a name. I was interested only in the \$1.60 the Government was willing to pay for a day's work. It was years later that I suddenly realized I could never be happy doing any other kind of work.

The Pretty Creek Project, with headquarters at Clinton, La., was one of the original pilot watershed projects. In order to help farmers establish examples of conservation practices, the Government provided labor and materials as well as technical help.

My first assignment was using a dibble to set out trees. My arms, shoulders, and back still ache when I think of it.

Soon we were sodding terrace outlets and outlet ditches. This seemed silly to me, but if they were willing to pay good money for this kind of foolishness, it was fine with me.

One day we were caught in a hard rain. It was fascinating to watch the water being collected by the terraces and emptied into the ditches and meadow strips. Then you could see the grass forming a mat and protecting the soil.

Imagine our shock when we were assigned the task of sprig sodding a field with wiregrass (bermuda-

Mr. Nesom graduated from high school and enrolled in the Civilian Conservation Corps in April 1934. He began work as a laborer for the Soil Conservation Service at Clinton, La., in 1937 and advanced to his present position of soil conservation technician. He has received certificates of merit for outstanding performance and for writing news articles.

grass). There wasn't a man in the crew who hadn't been fighting wiregrass all his life. The farmers weren't too happy about it either. Now, the people of this area believe that this is one of the finest grasses in the world.

The practice that attracted the most attention in those days was terracing. We saw terraces winding around the hills, but we were not sure how they "prevented erosion," as the engineers said. Sometimes we would almost pray for rain so we could see them in operation.

The day I began to learn about terraces was one of the most mystifying days of my life. I was given a rod and told to walk down the slope 50 feet, and raise the target until the level man told me to stop. Then he told me to raise the target another foot. I didn't know it then, but this was just following the formula for spacing terraces: slope in percent, plus two, divided by two.

The next instructions were to walk around the slope on the level and move the target one-tenth of a foot every 11 steps. The instructor said to raise the target if the water was to drain in the direction I was going, and to lower it if it was to drain the other way. By

this time I didn't know if I was coming or going. I decided to follow the old rows in the fields, and since they had been planted on the contour this worked fine.

Finally the line reached a sharp ridge, and every way I went was wrong. When I wound up at the same stake the third time, I decided it was time to ask for help. I put the rod down and walked to the next ridge to ask the level man what to do. He explained that the line would bend back in the direction from which it came.

As I started back to pick up the rod, I thought my troubles were over, but I was wrong. The field in which we were working was a cornfield, and I couldn't find the rod. Eventually, we picked it out of the cornstalks.

As I proceeded, I had the rod in one hand, a hatchet in the other, and a sack full of wooden stakes slung over my shoulder. When the shot was okay I would lay the rod down, take out a stake, and drive it with the hatchet. That was simple enough, except that when I stooped over the stakes would pour out of the sack and spill all over the ground. Experience finally ironed out these wrinkles, and work of laying out terrace lines went smoothly.

By that time I understood terraces! They were laid out on the contour with enough fall to take the water off the land but not enough fall to let it scour the channel. I was real proud of this knowledge and was ready to explain it to everyone. There was only one fly in the ointment; by that time everybody understood terraces, too.

One job we all hated was fighting woods fires. It was hard work, and there just wasn't any sense to it. Everyone knew that the fire would get rid of ticks, screwworms, boll weevils, snakes, and many other undesirable things. Burning the woods would also produce a fast growth of grass for the cattle.

I have since learned the fallacy of these beliefs. My education on this point began when I helped the project forester check the 10-year growth of a tract of timber. These woods had been protected from fire for 3 years and the growth over that period was unbelievable.

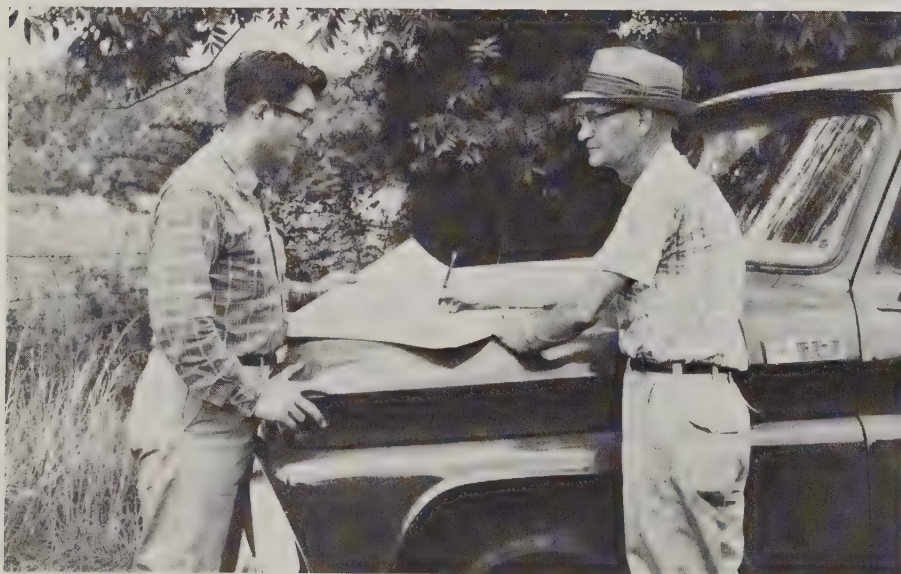
The Feliciana Soil and Water Conservation District was the first organized in Louisiana. That was in 1938 and the district took in the area covered by the pilot project.

This area began to change from row crops to pasture during World War II. I came home from the Army to find that another engineering practice had become important—the farm pond. My first experience with ponds was almost as bewildering as terracing had been. Gradually pond work became clearer, but after helping lay out 2,000 of them, I realize there are still many things to learn.

A change from mules to tractors has made terraces impractical on some of our farms. This brought the introduction into our area of the most beautiful practice in soil conservation, contour stripcropping. When you see strips gracefully winding around a hill it stirs the artist in you. The alternating bands of grass and row crops is indeed a breathtaking sight.

Conservation has become my magnificent obsession. ♦

Lee Nesom (right) discusses with Feliciana District Cooperator Dr. Edwin Walker a feature of his conservation farm plan.



Community restores a forgotten town

A year ago Lincoln (population 800) was the forgotten town in Talladega County, Ala.

Abandoned stores, a bank, a theater, warehouses, and gins gave evidence that Lincoln had seen better days and that it still labored under the same old problems that had plagued it for 30 years.

Activated by the Coosa Valley Resource Conservation and Development Project, the Lincoln Civic Action Committee came to the rescue. It adopted a community development plan that set forth problems, an inventory of resources, stated objectives, and prescribed measures to achieve them. The list of accomplishments in the year is impressive.

Chaired by Mary Henderson, a retired school teacher, the community committee has 20 members representing all areas of interest in the community and including the city council and mayor. It gave top priority to advertising the community, securing an adequate water system, providing for industrial development, completing a local watershed project, and improving school and recreation facilities.

First of all, the community extended the city limits of Lincoln to the areas needed for orderly urban development.

It secured two branch banks and, with the help of the Pell City Chamber of Commerce, persuaded a plastic pipe manufacturing company to locate a plant there that will employ 35 people.

It employed an engineering firm to design a modern water system, contracted for the installation of a water-storage tower and submitted an application to the Farmers Home Administration for loan of funds for the system.

Then the community completed the construction of the Lincoln athletic fields financed in part by a \$50,000 RC&D loan through FHA; organized and equipped three Girl



Above, beautification of the highway intersection and construction of the Lincoln Branch Bank both are community development projects, and the bank is an RC&D project measure. In the picture are Mrs. Mary C. Henderson, chairman of the Lincoln Civic Action Committee, Travis McCaig (left), vice chairman, and J. I. Kirksey, also a member of the town council. Below, Mr. McCaig visits the Clow Plastic Pipe Manufacturing Company plant, also secured through the action of the committee.



Scout troupes; organized an industrial development board; acquired options on three industrial sites; and at the request of the State Planning and Industrial Board prepared a community brochure for a prospective "bluechip" industry.

Also, it provided planting material and landscaped an intersection on U. S. Highway 78 with labor furnished by the State Highway Department; developed a schoolground improvement plan that included the seeding of a grammar school play-

ground, fencing of the high school grounds along the main street, installing a traffic light at the school street intersection, and paving parking and play areas.

After the year's accomplishments, the Civic Action Committee sponsored an appreciation dinner, and the 200 people who attended were the evidence that the committee had involved many people and organizations and that it had their support. —C. W. GLOVER, RC&D project coordinator, SCS, Anniston, Ala. ♦



The District's new permanent home serves Nebraska Sandhill ranchers.

Grass, cattle, and open space abound in sandhill conservation district

The Cherry County Soil and Water Conservation District, Nebr., is open cow country, made up of sand and grass, sprinkled with water, and wrapped in solitude.

It is 156 miles from district headquarters in Valentine to Andy Anderson's ranch. He is the farthest cooperator from the Cherry County office.

When Soil Conservation Service people visit him, they spend the night. It is a 12-hour round trip. Part of the road is paved highway, and the rest is a trail across open range.

Cherry County spreads out over 2,906,880 acres, most of it in the Nebraska Sandhills. It is Nebraska's largest soil and water conservation district, and the sixth largest in the United States. It has the largest acreage under Great Plains Conservation Program contract of any district in Nebraska. About a third, or 826,393 acres, of the county is or has been under contract for complete conservation treatment.

An active district

SCS people travel from a headquarters built especially for them by the district. The board of supervisors—Clint Hull, Lawrence Tur-

ner, and Everett Brown, all of Valentine, Joe Hammond of Kennedy, and Chairman Wesley Fox of Kilgore—are equipped to keep conservation work moving in their area.

With their own machinery they can plant grass or trees, spray weeds, or control pocket gophers that pockmark the ranges. These activities are under the supervision of District Manager Walter Carpenter and District Clerk Jeanie Lunsford. Last year the district's income from services performed was in excess of \$40,000.

The grass seed they plant comes right out of the Sandhills. Seed firms contract for standing crops which they harvest and process. And tree seedlings come from the Forest Service nurseries just across the line in Thomas County.

The SCS district conservationist is Willie Joe Holmes. After growing up in southeast Oklahoma, this 6-foot 200-pound cowman's friend "wandered off" to northern Nebraska and found a home in the strange world of the Sandhills.

This is a sparsely populated area—by people, that is. There are only slightly more than 8,000 of them scattered over nearly 3 million acres. But there are 40 times that many cattle—325,000 head, giving

Cherry County the exceptional range stocking rate of less than 10 acres to the cow.

Water and grass make the difference. Most ranches have wet meadows where hay yields are around 1½ to 2 tons to the acre, a high record for native grass hay.

You can get water with a post hole digger in these meadows. Many have small, jewel-like lakes in them. The deep sands absorb all the rain and snow—an average of 19 inches annually. Good supplies of livestock water can be had at 150-200 feet in the wells.

The Sandhills is perhaps the largest unbroken area of tall native grass in the country. Except for a few fields that had to be broken out to qualify as homesteads back in 1904-05, none of the grassland has ever been plowed. Former Governor Sam McKelvie called it "God's Own Cow Country."

Trees by design

Yet, this wide open cow country is also tree planting country. Cherry conservation district cooperators plant more than 200,000 every year—nearly 400,000 in 1966. There are only a few native pines along the Niobrara River, an occasional willow at the edge of a meadow, and the rare shade tree around a ranch headquarters, that have not been planted. Most of the others are in protective windbreaks or shelterbelts for livestock and homesteads. Where temperatures may be 25° below zero for many winter days and go to 107° in the summer, windbreaks are appreciated for their contribution to comfort.

With all its water Cherry landowners irrigate only a few acres, yet the district has a 55-mile long, concrete-lined irrigation canal

across it. The Sandhills country gives up its water easily into the 3,000-acre Merritt Reservoir on the Snake River, and the canal takes it across to the Ainsworth Irrigation District in neighboring Brown County. The system was built by the Bureau of Reclamation in 1964-65.

Few roads

U. S. Highway 20 crosses the Cherry District on the north edge. U. S. 83 slices north to south across the east side. From there you're on your own if you want to drive around. Some roads go out into the

hills and stop, leaving you a choice of many prairie trails that all look alike. The countless small, rolling hills and the sea of grass are without landmarks. If you aren't accustomed to driving in deep sands, get a horse. And a guide would be handy, too.

Visitors to Sandhills country are impressed with the quiet serenity of the grasslands. In winter only the windmills and windbreaks break the sea of snow. In summer millions of birds of many species sing their accompaniment to the wind. Beauty prevails because there is so much of it and so few people to spoil it. ♦

Nebraska watershed project speeds land treatment with cost-sharing program

By Raymond C. Kubie

Assistant area conservationist, SCS, Lincoln, Nebr.

Nebraska farmers in the Wilson Creek Watershed Project have stepped up lagging land-treatment practices in response to a special 3-year cost-sharing program funded by the Agricultural Stabilization and Conservation Service.

A special ACP cost-share project was approved by the Otoe County ASC Committee, and funds were earmarked for use over a 3-year period for each designated farm within the defined area of the watershed. Ordinarily, a farmer must make an annual or periodic request and cost-sharing is based on the availability of funds.

Also cooperating in the "pilot" land-treatment proposal were the

Otoe Soil and Water Conservation District, the Wilson Creek Watershed Conservancy District, and the Soil Conservation Service.

Farmers in the designated area gave overwhelming acceptance to the proposal, and more than \$72,000 was approved by the State ASC Committee for cost-sharing to help them carry out the conservation work.

In the 3-year period from June 1964 to July 1967, 53 farmers installed five grade stabilization structures, 1,379,000 lineal feet of gradient terraces, and 261 acres of grassed waterways. These practices are the foundation for improved soil management and land use techniques which make up the complete conservation plan.

The Wilson Creek Watershed Project, covering 77,900 acres in Cass and Otoe counties, was approved for operations in June 1960. Construction on the 88 structures began in 1962, but in 1964 the watershed board of directors noticed the lack of land treatment in one portion of the watershed in Otoe County. The "pilot" land-treatment program was proposed to keep the project on schedule.

Now, lack of land treatment will not delay structure installations. Two of the watershed structures for this part of the watershed have been installed, and one is scheduled for installation in 1969.

In the entire watershed, 45 of the 88 planned structures have been installed, and 60 percent of the total land-treatment requirements have been applied to the land. The board of directors looks forward to final construction phases by 1973 and the fulfillment of a dream begun in 1957 when the Wilson Creek Project was only an idea. ♦

A complete conservation plan is applied on land above a watershed dam.



Meetings . . .

New horizons for Water Works Association

"New Horizons in Water Supply" will take the spotlight at the 89th Annual Conference of the American Water Works Association to be held on May 18-23, San Diego, Calif.

The association plans to hold 29 technical sessions. Some of the topics are on offshore fresh-water reservoirs; taking Mississippi River water to Texas and New Mexico; the art of desalting water and an analysis of the corrosion effects of desalted water; training goals for water utility; treatment problems in industrial water systems; problems of engineering and construction; and metropolitan area problems.

Urban Land Institute holds land use symposium

The Urban Land Institute will hold its first annual Land Use Symposium in Miami, Fla., on May 19-22. The symposium will be on "Land, Recreation, and Leisure."

Since one of the Institute's objectives is to evaluate land use trends in the light of changing economic, social, and civic needs, the ULI members will discuss and study the significance of this new and dynamic category of land use.

Field trips will be made by boat and bus to the recreation and resort communities in the Miami area.

Garden Club Council 40th Annual Meeting

The National Council of State Garden Clubs will hold its 40th annual meeting in Dallas, Tex., May 8-14. This year's theme is "Our Fortieth Year—Pride and Purpose."

Among the speakers will be Dr. Henry M. Cathey, leader of ornamental investigations, with Agricultural Research Service, Washington, D. C.

The conservation program will

feature the Big Thicket area of Texas, which has been proposed as a National Monument. Speaker is Dempsie Henly, president of the Big Thicket Association which favors preservation of the area.

Mrs. Charles O. Dean of Leland, Miss., is the outgoing president, and Mrs. William H. Barton of Lansing, Mich., will succeed her.

Rivers and Harbors Congress to discuss water research

The National Rivers and Harbors Congress will meet May 13-16 in Washington, D. C. Committee members will discuss such topics as inter-relationship of irrigation, industrial, municipal, and water research; recreation and wildlife; navigation and defense transportation; pollution; and flood control.

At the end of the meeting, there will be an inspection trip to the Naval Ship Research Center, Carderock, Md.

Southern Forestry Conference meets in Arkansas

"The Increasing Urban Trend—Its Impact on Forest Farming" will be the theme for the 1969 Southern Forestry Conference, sponsored by the Forest Farmers Association and held in Hot Springs, Ark., May 1-2. There will be a slide presentation of the recently completed Southern Forest Resource Analysis by Philip R. Wheeler, who was the leader in the analysis.

Contractors hold soil and water conservation show

All the conservation construction projects that might normally be done on the farm in 20 years will be completed during the 3 days of the Illinois Land Improvement Contractors Association Third Soil and Water Conservation Show to be held near Benton in Franklin County, Ill., August 19-21.

This event, cooperatively sponsored by the Contractors Association, SCS, and ASCS, will take

place on the farm of Mr. and Mrs. Robert C. Smith of Royaltown.

With SCS providing the technical assistance, the show features construction of parallel terraces, waterways, and earth dams; creation of a campsite; surface drainage; land leveling; land clearing; timber stand improvement; and seeding and tillage demonstrations.

Dates and places

May 1-2, Southern Forestry Conference, Hot Springs, Ark.

1-2, American Concrete Pipe Association, Technical Conference, Denver, Colo.

4-7, Association of American State Geologists, Tucson, Ariz.

8-14, National Council of State Garden Clubs, Inc., Dallas, Tex.

11-14, National Forest Products Association, Washington, D. C.

11-18, Soil Stewardship Week

13-16, National Rivers and Harbors Congress, Washington, D. C.

18-23, American Water Works Association, San Diego, Calif.

19-23, Urban Land Institute, Miami, Fla.

June

2-6, General Federation of Women's Clubs, Cleveland, Ohio

3-13, International Conference on Arid Lands, Tucson, Ariz.

8-11, 16th National Watershed Congress, Louisville, Ky.

15-18, Outdoor Writers Association of America, Inc., Duluth, Minn.

15-19, American Seed Trade Association, Denver, Colo.

22-26, American Institute of Architects, Chicago, Ill.

22-26, Air Pollution Control Association, New York, N. Y.

22-27, National Association of Sanitarians, Denver, Colo.

23-27, Water Resources Council, Salt Lake City, Utah

23-28, 3d National Conference of State and Federal Water Officials, Salt Lake City, Utah

26-29, Association of Consulting Foresters, West Dover, Wyo.

27-29, Western Association of State Game and Fish Commissioners, Teton, Wyo.

29-July 4, National Education Association, Philadelphia, Pa.

Farmers can get paid for recreation

Farmers cooperating in the Crop-land Adjustment Program can receive payment for permitting hunting, fishing, and other recreation upon land removed from the production of certain crops. ♦

Review



The Nation's Water Resources: The First Assessment of the Water Resources Council. 1968. *Water Resources Council, Washington, D. C. (Paged by sections); maps and charts.* \$4.25. *Part I, Summary Report, issued separately.* 32 pp. \$0.65.

An outgrowth of a recommendation in the 1961 report of the Senate Select Committee on National Water Resources was a provision in the Water Resources Planning Act for the Water Resources Council "to maintain a continuing study and prepare periodically an assessment of the adequacy of supplies of water necessary to meet the water requirements in each water-resource region in the United States and the national interest therein."

The purpose of the National Assessment is to keep the President, the Congress, and the public informed of current and projected regional and national water and related land resource needs and of current and prospective action necessary to meet those needs.

The first resulting report describes the present situation with projections to the year 2020 and gives the council's recommendations.

The report estimates that withdrawals of water for all uses, estimated at 270 billion gallons a day (bgd) in 1965, will rise to almost 1,370 bgd in 2020, indicating the need for increased water reuse and the development of new technology to augment existing supplies.

Part VI includes a chapter on the water supplies and requirements of each of the 20 water-resource regions. Twenty additional chapters present national statements on various phases of water and related land resources, such as agricultural water use, floods and flood damages, water quality, watershed lands, and land drainage.

The report estimates the national flood losses at \$1.7 billion in 1966, of which 59 percent occurred in upstream flood plains. Without further flood-prevention work, the average annual damages would be expected to rise to about \$5.1 billion in 2020.

Watershed problems will intensify as nonagricultural uses increase from 177 million acres in 1960 to an estimated 281 million acres in 2020. The council states that increased emphasis is needed on adequate treatment and management of agricultural and other water-related lands to protect streams and water supplies from siltation and other adverse quality changes. Increased attention should be given to planning for land changing from agriculture and forest to urban development to avoid erosion and sedimentation.—SHELDON G. BOONE, *River Basins Division, SCS, Washington, D. C.*

The Johnstown Flood. BY DAVID G. MCCULLOUGH. 1968. *Simon and Schuster, New York.* 302 pp., illus. \$6.95.

Here is a book that should be required reading for every SCS engineer and, more important, for every nonengineer who ever felt that perhaps we tend to overdesign the dams we build.

What happens when a dam fails because of faulty design and because unusual storms are not taken into account is dramatically described in *The Johnstown Flood*.

On May 31, 1889, a wall of water, in some places 70 feet high, smashed through Johnstown, Pa., killing, in a matter of minutes, more than 2,000 men, women, and children.

"It was like turning Niagara Falls into the valley for 36 minutes," according to later studies by civil engineers who estimated that 20 million tons of water was suddenly turned loose to crush the unwary victims below.

Many readers no doubt remember hearing their parents tell of this

catastrophe—of the lone horseback rider who, reportedly, dashed down the valley ahead of the wall of water warning everyone to flee to the hills. Even though this particular incident appears to be no more than legend, there are enough chilling facts to drive home a vital point made in the book: "If man, for any reason, drastically alters the natural order of things, setting in motion a whole series of chain reactions, then he had better know what he is doing."

David McCullough, experienced historian, has delved into the details of this tragedy and has come up with a story that has wide appeal. Conservationists will find information of added interest closely related to work they do daily. SCS designs and helps build dams much larger than this one. To read of the fatal flaws in the Lake Conemaugh Dam, and of what could have been done so easily to prevent the tragedy, makes this book not only fascinating reading but enlightening lesson material.—ALBERT B. FOSTER, *Information Division, SCS, Washington, D. C.*

New publications

Control of Agriculture-Related Pollution. 1969. *A report submitted to the President by the Secretary of Agriculture and the Director of the Office of Science and Technology.* Washington, D. C. 102 pp. plus tables. A comprehensive federal research and action program designed to combat agriculture-related pollution of the Nation's water, soil, and air is recommended after a governmentwide review of the pollution problem which concerns agricultural interests.

This special report recognizes the extensive federal programs already underway which aid in combating pollution but points out the need for expanded effort to improve the quality of the environment.

The report states that water pollution by soil sediment has been reduced substantially, both as a direct pollutant and as a carrier of other pollutants, through conservation programs carried out during the past 3 decades. It recognizes, however, that sediment is still a major pollutant which costs the Nation more than \$500 million annually and recommends that increased technology be applied to reduce such damage.

Other pollutants considered in the report include animal wastes, wastes from industrial processing of raw agricultural products, plant nutrients, forest and crop residues, inorganic salts and minerals, pesticides, and air pollution in relation to agriculture.

The report urges those engaged in agriculture and forestry to study ways and means of reducing pollution from agriculture-related sources and to include pollution control wherever possible in research and action endeavors of the future.

Education and Outdoor Recreation. BY SAMUEL T. DANA. 1968. *U. S. Dept. Int., Bureau of Outdoor Recreation.* 47 pp., illus. \$0.75.

As a contribution to the Bureau of Outdoor Recreation's evolving nationwide plan for outdoor recreation, this study was conducted by the Dean Emeritus of the University of Wisconsin School of Natural Resources, Dr. Samuel T. Dana.

The rationale for such a study was the premise that "users of outdoor recreational opportunities and facilities must have the skills, motivation, attitudes, and knowledge necessary to obtain optimum benefit from the recreational experience and to leave unimpaired for others the resources that they use."

Dean Dana surveys formal and informal educational programs in the subject and makes recommendations for the future. "There must be education for the outdoors as well as *in* the outdoors," he says. "What a person gets out of a recreational experience depends in large part on what he brings to it."

Profiles: Careers in the U. S. Department of Agriculture. 1968. *USDA Misc. Publ. 1071.* (125 pp.), illus. \$3.25. Divided into four sections: I describes the federal career service; II briefly describes the functions of the USDA agencies; III outlines the careers in administration, agricultural marketing, agricultural programs, research science, engineering, and in other professions; and IV indicates employment opportunities by college majors and agencies.

Skiing. BY U. S. FOREST SERVICE. Rev. 1968. *USDA PA-525.* (30 pp.) illus., color. \$0.50. The Forest Service's booklet on skiing in "the National Forests — America's playgrounds" is brought up to date with color illustrations and a new inventory of ski areas.

Recreation in the Nation's Cities: Problems and Approaches. 1968. *National League of Cities in cooperation with U. S. Department of the Interior, Washington, D. C.* 95 pp., illus. Based on a survey of 15 representative cities, the report identifies municipal recreation problems and discusses the reasons for increased recreation needs; examines various solutions, with emphasis on inter-

governmental approaches; and outlines the various planning methods used in city recreation departments.

Creative Conservation for Life and Living. 1968. *Proceedings of 23d annual meeting of Soil Conservation Society of America. SCSA, Ankeny, Iowa.* 190 pp. \$5. In addition to the papers of 52 speakers on land resources as related to environment, the volume carries information about the society, several of its technical committees, and the papers of a student symposium.

Open Space: Its Use and Preservation. BY JEANNE M. DAVIS AND PETER HOUSE. 1968. *USDA Misc. Publ. 1121.* 19 pp. Open-space lands should be identified according to the major use of the land, not merely as "open space." This publication defines the term "open space," and discusses concepts, functions, uses, and public acquisition of open space.

Showdown . . . for Water. 1968. *U. S. Dept. of Interior CWA-11.* 28 pp., illus. \$0.65. Outlines program for water-pollution control.

Soil surveys

Belknap County, New Hampshire. BY THEODORE L. KELSEY AND FRANK J. VIEIRA. 1968. 68 pp., illus.; maps 4

inches to the mile (1: 15,840). Fieldwork by Harvel E. Winkley, Frank J. Vieira, Theodore L. Kelsey, and Dirk van der Voet.

Jenkins County, Georgia. BY JACK R. BROWN. 1968. 61 pp., illus.; maps 3.17 *inches to the mile (1: 20,000).* Soils surveyed by Jack R. Brown, Daniel D. Monts, and Herschel L. Paulk.

Crowley County, Colorado. BY ROY J. LARSEN, DONALD R. MARTIN, AND RICHARD E. MAYHUGH. 1968. 70 pp., illus.; maps 4 *inches to the mile (1: 15,840).*

Scotts Bluff County, Nebraska. BY DONALD A. YOST, DENNIS L. BROWN, LOUIE L. BULLER, AND JAMES O. OLSON. 1968. 119 pp., illus.; maps 3.17 *inches to the mile (1: 20,000).*

McPherson County, Nebraska. BY LESTER E. SHERFEY. 1969. 35 pp., illus.; maps 2 *inches to the mile (1: 31,680).*

Clarke and Oconee Counties, Georgia. BY STANLEY M. ROBERTSON. 1968. 55 pp., illus.; maps 4 *inches to the mile (1: 15,840).*

Hughes County, Oklahoma. BY ROSCOE M. LONG. 1968. 48 pp., illus.; maps 3.17 *inches to the mile (1: 20,000).*

Washington County, Oklahoma. BY DOCK J. POLONE. 1968. 41 pp., illus.; maps 3.17 *inches to the mile (1: 20,000).*

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



America The Beautiful—South Carolina

USDA SOIL CONSERVATION SERVICE

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Multipurpose water plans

A continually broadening approach to water-resource planning is resulting in a corresponding increase in the proportion of watershed projects being designed to serve a combination of purposes along with the primary aim of flood prevention.

Most of the Nation's river drainage areas are now involved in some type of comprehensive river basin investigation which considers interrelated land and water resources in relation to the basin's needs. The same philosophy prevails in all SCS participation in water-resource planning, whether in formal river basin surveys or elsewhere.

The result is a generally more comprehensive type of project today than prevailed in early operations under the Watershed Protection and Flood Prevention Act when most plans were aimed essentially at the single purpose of flood prevention. Most projects today also include works of improvement for such purposes as drainage, irrigation, recreation, fish and wildlife, municipal and industrial water supply, and low flow augmentation. Increased emphasis is also being given to esthetic and environmental qualities of the countryside. By the end of 1968, 54 percent of approved projects were multipurpose, compared to only 27 percent 10 years ago.

Since the Watershed Protection and Flood Prevention Act was passed in 1954, many rural and urban communities have taken advantage of its provisions. Experience has shown that most watershed problems are unique to local communities. The multipurpose project approach has the flexibility and effectiveness needed to meet the problems of local communities.

For example, a small city or town may include storage for a municipal water supply as part of a multipurpose structure, usually at less total cost than when developed separately. A municipality would bear the full cost of a single-purpose structure for municipal and industrial water supply; by including it as part

of a multipurpose project the city or town would pay only that part of the cost allocated to water-supply storage. Municipalities are also eligible for long-term, low-interest loans for this purpose.

The inclusion of recreation and fish and wildlife developments in multipurpose watershed projects continues to be one of the more popular phases of the small watershed program. Increased recreational resources are being created in areas where new water sources are being developed.

Small watershed projects are opening the way for new economic growth and vigor to small towns, cities, and rural areas in all parts of the Nation. These improvements are making available a wide variety of opportunities to urban and rural people alike.

Locally sponsored and federally assisted multiple-purpose watershed projects are an excellent means of developing the water and related land resources needed to sustain and nourish our growing national economy. These projects provide a practical mechanism for concerted cooperative action, under local initiative and control, in the development and management of the resources of each watershed.

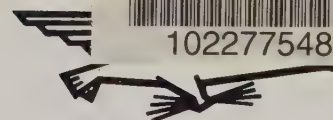
Watershed and river basin planning today involves the full range of interrelated natural resources. The preservation, development, and use of these resources must take into account the total environment. A narrow planning approach, dealing only with one use, or one resource, or one purpose, will not provide a harmonious whole that will serve as a satisfactory human environment.

Through coordinated development of resources and a blending of uses it is possible to improve the quality of the natural world in which we live. This type of comprehensive planning helps to protect and preserve the natural environment and at the same time helps to produce the optimum output of goods and services from our soil, water, forest, wildlife, and other resources.

Kenneth E. Grant



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People make watershed a blue-ribbon project

Interest and cooperation of landowners and many organizations made the Middle Fork of the Anderson River Watershed Project in Indiana a blue-ribbon project.

The Middle Fork watershed was named the 1968 National Watershed-of-the-Year at the National Watershed Congress in New Orleans. Karl Gayer, Conservancy District chairman, after receiving the award, said, "This total watershed development is taking place because of many people's efforts and their cooperation with many agencies. About 38 organizations are cooperating to move this project to its successful completion."

At first, a small group of farmers on the mainstream of the Middle Fork below Bristow tried to keep the channel clear of trees and debris. But, what they needed was to slow the floodwaters in the farm and timber lands above.

This opportunity came with the passage of the Watershed Protection and Flood Prevention Act. Local people organized. Later the Perry and Crawford soil and water conservation districts sponsored the 69,000-acre Middle Fork Watershed Conservancy District.

During the development of the flood-retarding plan, local leaders joined with the Forest Service to include Hoosier National Forest in the watershed project. Four of the six floodwater-retarding structures became multiple use to include recreation. The plans also called for conservation land treatment in the upland by private landowners.

"Some 300 of the 350 land-



Saddle Lake camping area in the Middle Fork of Anderson River Watershed Project, Ind., proves popular with vacationers. (Courtesy of Kentucky Courier-Journal and Louisville Times.)

owners are cooperating with their local conservation district," states Al Dauby, chairman of the Perry County District. "More than 80 percent of the needed woodland practices, pasture improvement, grassed waterways, diversion terraces, and ponds are on the land. The 5-year tree planting goal of 1,000 acres on severely eroded land has been exceeded in 4 years. For this we owe thanks to the Lincoln Hills RC&D Forestry Committee, Indiana Department of Natural Resources, Agricultural Stabilization and Conservation Service, Soil Conservation Service, Kiwanis Clubs,

and many others."

Landowners and public officials are already giving testimony to the benefits resulting from reduced flooding. Charles Meunier, former Perry County Highway superintendent, summed it up when he stated, "School transportation was uninterrupted this past year in the protected area of the watershed, while only 1 year ago buses were either delayed or they had to be rerouted 16 times."—WILLIS J. RIDENOUR, *district conservationist, SCS, Cannelton, Ind.*, ROBERT L. MILEY, *district ranger, U. S. Forest Service, Tell City, Ind.* ♦

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JUNE 1969

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soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES



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CONSERVATION IN THE GREAT PLAINS

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: A buffalo bull on the Niobrara Wildlife Refuge in Nebraska. The refuge is a cooperator with the Cherry County Soil and Water Conservation District. SCS helped make the range conservation plan.

Arena . . .

We look this month at one of the prime arenas of conservation effort in America—the Great Plains.

Out of the distress of land and people in that high, dry, windy area a generation ago came one of the compelling arguments for a national conservation program.

In its blowing fields and parched pastures were devised and tested farming and ranching practices that would still the sand and husband the moisture to make a tenable home for crops, livestock, and people.

In 1956 the Congress authorized a special program to effectuate those practices. We asked our fieldmen, "How well has it worked?"

Response: Out of the flood of case histories, summaries, and testimony we offer an appraisal that lays no claim to being detached or objective. It bespeaks the involvement of veterans of that conservation arena who see the success of their efforts.

(Bill Vaught (p. 243) grew up in Wyoming and writes from a full conservation career in the Plains, aided by Doc (T. A.) Jenkins who learned his newspapering in Oklahoma and Texas.

The staff-written article on women in the Plains (p. 250) is by Janice Curtis. Although stationed now in bluegrass-green Kentucky, she came by her sympathy for dust-harried housewives as a girl and student in Nebraska and an SCS writer at Lincoln.

The selection of case-history vignettes (p. 246) speak eloquently for the fieldmen who reported them.

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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CLIFFORD M. HARDIN, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

BEN O. OSBORN, Editor

GEORGIE A. KELLER, Production Editor

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A decade of action...

Great Plains Conservation Program

... focused on a region

By William L. Vaught

Resource Development Division, SCS,
Washington, D.C.

Historians and scientists alike recognize the Great Plains as a region unto itself.

Drought is a continuing threat in parts of 10 states bounded on the west by the Rockies and on the east by the imaginary line where rainfall averages 20 inches a year.

Duststorms and economic distress in this region in the 1930's gave impetus to launching a national soil conservation program that now blankets the Nation with active conservation districts.

But the ordinary scope and rate of land treatment by private action, even with the encouragement of dis-

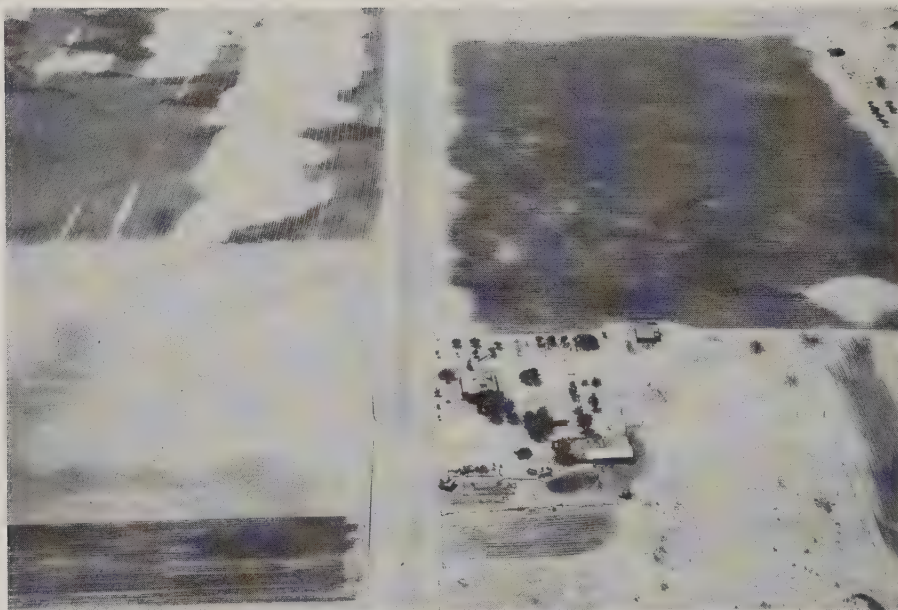
trict leadership, did not cope adequately with the climatic and physical hazards of Plains agriculture.

It was in the course of the long drought of the 1950's that agricultural leaders of the Great Plains proposed to Congress a special program to bring soil and water conservation principles to bear in a coordinated and concerted fashion on the peculiar problems of the region.

The Great Plains Conservation Program Act of 1956 embodied the recommendations of conservation districts, Land Grant colleges, experiment stations, and other indigenous organizations and agencies.

New livestock watering facilities and good range management add stability to a ranch operation.





Farmstead and fields in the Plains without benefit of conservation practices (left) are exposed to winds and blowing soil. Where adjoining farms use windbreaks and conservation cropping systems (below), the people and the land are protected.

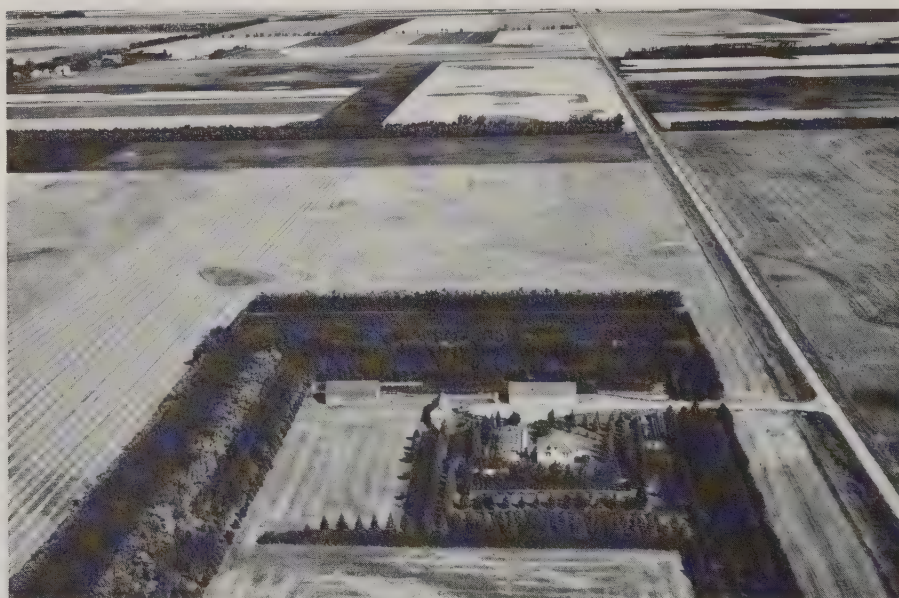
Use of the land within its capabilities would be basic. Conservation use and management of plant and water resources would give stability to agriculture and hence to the industry and economy of Plains communities.

The law authorized \$150 million for a 15-year program and directed the Soil Conservation Service to give priority help to landowners wanting to participate. Most of the federal funds would be used for cost-sharing to enable farmers and ranchers to do their conservation work more rapidly than their own resources would permit. The law stipulated that a participating landowner would develop a satisfactory conservation farm or ranch plan, work out a timetable for applying it, and enter into an agreement with the Secretary of Agriculture.

A decade in review

Now that the 1971 expiration date of the original authorization is drawing near, it is proper to take stock of more than a decade of operations of the program.

As of January 1, 1969, the number of landowners taking part in the Great Plains Conservation Program has passed the 32,000 mark. Their holdings totaled 59 million acres, roughly one-sixth of the land in farms and ranches in the 423 par-



ticipating counties within the authorized program boundaries. One out of every nine landowners in the area has taken part in the program.

Preliminary returns of the updated Inventory of Soil and Water Conservation Needs for the Plains States indicate that modern conservation techniques applied by these and other conservation cooperators are proving equal to the task.

The program's direct contribution can be measured in acreages of hazardous cropland now covered with enduring and profitable grass, in

expanses of stripcropping and contour cultivation and miles of terracing for erosion control and moisture conservation. It can be seen in the green rows of tree windbreaks, the thousands of stock-water facilities where there had been none, the rippling seas of range grasses where a few years ago there was mostly brush or bare land.

The return of poor quality cropland to grass from the beginning has been one of the program's objectives. The new Conservation Needs Inventory, with figures drawn from

the 423-county area, shows that the amount of unsuitable cropland still in cultivation has been reduced to 5.5 million acres from the 1958 figure of more than 11 million acres. Well over 2 million acres of this low-grade cropland has been covered with productive grass.

Cropland under contract for conversion to grass but yet to be seeded totals 438,000 acres. It is estimated that by January 1972, the area needing such treatment will have been reduced to about 4.5 million acres.

Most of the unsuitable cropland, some 3.5 million acres, according to the inventory, has suffered severe erosion damage. The soils of an additional 800,000 acres are considered too unstable to remain in cropland use.

Restoring rangeland

Damaged rangelands also rank high in priority for attention in the Great Plains Program. The Conservation Needs Inventory shows 12.6 million acres out of 214 million acres in range and pasture in the area needs conservation treatment by reestablishment of grass cover. About half of this acreage has been seriously damaged by erosion.

By 1972 the range acreage needing conservation treatment will have been reduced to 11.8 million acres, according to the estimates.

For conservation work done and still under contract with the Secre-

Progress at a glance

Great Plains Conservation Program to December 31, 1968

Number of contracts	32,352
Area covered	
by plans, acres	58,964,305
Average unit	1,822
Permanent cover	
established, acres	1,446,662
Rangeland reseeded, acres	1,099,405
Windbreaks, acres	24,559
Terracing, miles	50,559
Contour stripcropping, acres	123,596
Dams for erosion control	17,292
Ponds for use of	
vegetative cover	17,510
Wells for livestock water	12,417
Pipelines for	
livestock water, miles	3,154
Control of competitive shrubs, acres	3,731,304
Permanent fencing, miles	8,253
Reorganizing irrigation systems, acres	3,031

tary of Agriculture, the Federal Government has paid out, or obligated, \$113,734,000 in cost-share funds. The per-farm average year by year has ranged from \$3,471 to \$3,842, the larger figure the result of large units entered in the program's early years.

The number of landowners who have completed their work and terminated their agreements is nearing 15,000. Their farms and ranches, which have been fitted with needed soil and water conservation measures to make them erosion-resistant and economically stable, add up to around 24 million acres.

What happens to a farm or ranch when the conservation job is done?

In Texas, Assistant State Conservationist James D. Abbott, who directs the Great Plains Conservation Program in that state's 98 participating counties, conducted a survey to see.

Completed contracts

Of 4,050 farms and ranches visited, the owners of more than nine of every 10 were keeping their conservation work at a level satisfactory by conservation standards. Actually a fourth of the number had invested in further improvements.

In a few cases—and in most of these instances the farm or ranch had been sold to owners not familiar with the hazards of Plains agriculture—the work was not being properly maintained.

Looking back over their experience in the program, landowners had these observations to report:

They had gained in the process a clear understanding of the needs of their land.

Their conservation work had given economic stability to their enterprises.

The opportunity to do an entire conservation job in a short period had led many to enter the program.

And some of the smaller operators said the added economic stability in their enterprises had enabled them to stay on their farms.

The Texas survey indicated that work accomplished under the program in the 98 counties in the 11

Good grazing management insures livestock feed and soil protection in the naturally unstable Plains environment.



years of activity amounts to from 10 to 15 percent of the conservation work needed in the area. Achievements would have been greater had funds been enough to meet the requests of all applicants.

Community benefits

Benefits to entire communities as a result of the program are not easy to measure, but they are nonetheless real. New economic stability of landowners and operators is reflected in a more solid foundation under the total economy of an area. Cash reserves, as useful a device in a Plains emergency as silos filled with feed, are on deposit. Along with the feeling of general security that appears to be growing in Plains communities is the general pride in the appearance of the country.

A North Dakota county commissioner, Jake Swenson of near Bismark, himself a participant in the Great Plains Conservation Program, spoke of benefits enjoyed by his community as well as the increased efficiency of his own farming.

"It has meant less dust in the air and clearer water in ponds and streams," he said. "It has helped the wildlife in our area. It has made our surroundings much more attractive."

In Colorado, Rancher Russell D. Lohr proudly showed his new Great Plains contract to the banker who had suggested he look into the program.

"Every practice you add builds your ranch and your future," Lohr said the banker told him. And the rancher added: "Also we are going to have a better place to live."

The President's special committee on the Great Plains, reporting its findings in 1936, pointed out: "The success of a longtime plan for essential readjustments in the Great Plains economy in the final analysis will depend on local action even more than on federal or state action . . . primarily the responsibility rests on the people in the Great Plains states."

This appears to be the way it is working out. ♦

In the Great Plains...

Conservation in action

The success of the Great Plains Conservation Program can be measured not so much in its effect on resources as on the lives of people.

The rancher with no water and too little grass, the farmer almost ready to move to town for a wage-paying job, the landowner group with not quite enough land for each to make ends meet, the man troubled by the sight of his land blowing and washing away—these are the people who looked to the new program for help and got it.

There were sure ways to solve the problems, ways thoroughly tested in drought and downpour; but solving the problems, it has been shown, requires getting needed conservation measures applied for all the resources of the Plains rather than for a part of them.

Here are glimpses of the way the Great Plains Conservation Program, offering on-the-spot technical help, cost-sharing for much of the job, and systematic scheduling of steps toward a complete resource conservation plan, has contributed to the improvement of living throughout the 423-county area.

New Mexico

Credit and conservation plan give new assurance

To Amadeo Quintana the many problems he faced seemed too much. He was at the end of his riata. The only solution appeared to be to give up his 838-acre place and go to the city to find a job.

There was little return from the part of his ranch that had been in cultivation. The grassland was infested with brush and producing poorly. He needed far more fencing. He was hauling water 4 miles to some of his grazing areas.

Improvements? Where could Quintana find the money?

A loan from the Farmers Home Administration solved a part of his problem. A complete conservation ranch plan he worked out with SCS conservationists and included in a Great Plains contract brought further reassurance.

The plan is half installed now, and Quintana is encouraged. Live-stock water, abundant and dependable, is where it was needed. Brush is under control. Old fields, seeded

to a nurse cover crop, are ready for planting to good range grasses.

Quintana already is reaping results from a unit now approaching economic stability. He no longer thinks of the job in town.—JOHN WARNER, *district conservationist, SCS, Roswell, formerly Mountain-air, N. Mex.*

Wyoming

Water spreaders grow more hay while they heal gullies

Oscar Middleton's story is like that of many Great Plains ranchers who year by year saw what rainfall they got run off rapidly, carrying soil and lengthening gullies.

By working through the Great Plains Conservation Program, Middleton, near Douglas, Wyo., stopped erosion and, with a system of dikes, guided the runoff over the land in an orderly manner, giving it a chance to produce forage for his stock. He is cutting hay from some of the land, more than 100 tons where 30 tons was a good crop before. The gullies are filling in.

"I didn't have to wait a lifetime



(Photo courtesy Colorado Game, Fish, and Parks Division).

to get my money back either," he said. "And see those trees around the meadows and the buildings." The slowed-down runoff, giving needed moisture to the soil, has made the trees possible, he explained.—MYRON J. WAKKURI, *range conservationist, SCS, Douglas, Wyo.*

Colorado FHA loan, Plains contract aid association

The Chimney Canyon Grazing Association in northeastern Colorado grew out of a typical need in the Great Plains—small landowners urgently needing more grassland for a sound, family-supporting operation.

A Farmers Home Administration loan helped the 42 members put the unit together from three former ranches. The association called on the Soil Conservation Service specialists assigned to the Peetz Soil Conservation District for help in developing a Great Plains Conservation Program plan.

A range site inventory showed the need for sound grass management. Much of the cover was good, but there were poor condition areas where grazing stock had been concentrated. Well-placed water, too, went into the plan.

Cross fencing for proper management was high in priority. The members agreed that bottom fence strands would be at least 15 inches

above the ground. Antelope, you see, go under fences, not over as deer do. And wildlife, as a resource of the land, is highly regarded by landowners like those in the Chimney Canyon Association.—TOM EAMAN, *range conservationist, SCS, Denver, Colo.*

Texas

Restoration of gullied fields builds land values

Alvin Roberts sells real estate in the Upper Elm-Red Soil and Water Conservation District in Texas, particularly in Montague County which came into the Great Plains Conservation Program in 1966.

Much of the county is in the sandy, hard-to-manage West Cross Timbers area, a section known for yawning gullies.

"Before we had this program, it was hard for our SCS people and our district supervisors to convince owners that it was practical to put abandoned fields into grassland. A few people tried it and showed it would work. Now everybody wants to work out a Great Plains Conservation Program plan, but we always seem to be out of money."

Roberts had something else to report: "I've seen people get a Great Plains Program contract because they wanted to fix a gullied area. But their contract would call for other things like rotation grazing, proper stocking, or crop residue management. They learned that these management practices, which gave them no cost-share help, were

A gullied area in the Upper Elm-Red Soil Conservation District in Texas was shaped and sodded. The second picture was taken 9 months after the first.





Improved grass and water put South Dakota livestock operation on a sound basis.

worth more to them than the work they wanted in the first place. And you know," he added, "it helps our county's image every time somebody cures one of those ugly spots."—TOMMIE HAYES, *district conservationist, SCS, Bowie, Tex.*

South Dakota

A brighter family future and a stronger community

The years 1959 through 1962 were dry ones in the neighborhood of Vale, S. Dak., and Kenneth B. Johnson was gravely concerned.

Only the deep pond had water at all, but the mud was so thick the cattle couldn't reach it. No grass grew. Johnson was having to buy feed and haul water from 7 miles away. The future—if there could be said to be a future for the family—was looking dimmer every week.

Johnson asked the supervisors of the Elk Creek Conservation District for help with conservation work he needed. He worked out a plan with SCS conservationists helping and signed a contract under the Great Plains Conservation Program.

The seeding of cropland to hay and pasture, the drilling of a well with pipelines to the water-short pastures, dikes to allow more efficient use of rainfall on the grassland—these and more were steps in the Johnson conservation plan.

The Elk Creek District board now points to the Johnson ranch as one of many contributing to the stronger economy of the community.

The family's outlook is brighter. The two boys are in South Dakota State University, and Susan is in high school in Sturgis. Mrs. Johnson is busy with community activities.

Johnson? He became a member of the soil conservation district board, which he now serves as chairman.—G. HARLAND MEANS, *district conservationist, SCS, Sturgis, S. Dak.*

Kansas

Systematic seeding program makes progress with grass

Not every year in southwestern Kansas can you expect grass seedings to be successful.

Since giving up on wheat farming in the 1950's, Charles and George Light of near Liberal in the Seward County Soil Conservation District had been planting grass on cropland and on their depleted range with only occasional success. The sagebrush, weeds, and poor grass species still appeared to have the upper hand.

A complete conservation ranch plan under the Great Plains Conservation Program seemed to give the Light brothers confidence. They started their systematic grass-seeding

program in 1960 by furrow seeding 649 acres to a sandyland mix of bluestems, gramas, indiangrass, switchgrass, and sand lovegrass. They kept up the grass seedings in following years, with marked success, and built fencing for conservation management of their improving crop of grass.

Their 3,489 acres of rangeland now supports 200 beef cows and goes on improving. The ugly blowouts are hard to find, and sagebrush and weeds are disappearing. The brothers say that the opportunity to do their conservation work with timely assistance from SCS specialists, with cost-sharing and systematic timing of work, came at—for them—a good time.—RAYMOND S. CLARK, *district conservationist, SCS, Liberal, Kans.*

Texas

Landowners win gratitude of city and county

Ten landowners, using help from the Great Plains Conservation Program to do their conservation work, have won an expression of gratitude from a city, the county commissioners, the highway department, an oil company, a fertilizer firm, and a utility company. The airport manager said thank you, too.

The city: Dumas, Tex. The county: Moore.

One of the sudden downpours characteristic of that area of the Texas High Plains used to mean a sure flood in the downtown and some of the surrounding sections.

The conservation plans serving the landowners could also help solve the associated problems in town. A flood-retarding dam on the ranch of Mrs. A. B. Burnett was one of the corrective steps. Miles of waterways, to carry the water safely to natural stream courses, were finished 2 years ago on the Burnett, Edward Stallwitz, George Ricketts, Alma Neiman, Ronnie Wells, Arthur Stokes, and Hershell Berry places, and on adjoining city and county land.—FRED SQUYRES, *district conservationist, SCS, Dumas, Tex.*

Is the Great Plains Conservation Program meeting its intended objectives? The 4,478-acre ranch of Bill Tullos, Mertzon, Tex., offers an answer.

Ten years before the launching of the Great Plains Conservation Program, a range conservationist studied the resources of the ranch and made his report. All the rangeland was in poor condition—too many grazing animals and almost no usable grass. What grass there was was of low quality.

The severe drought of the 1950's settled the matter for a time—all the livestock had to be sold, the land lay idle.

In 1957 improving moisture produced enough forage for 5,200 lambs for 6 months in winter and spring. But the forage was low in quality, and weight gains were disappointing.

The comeback road

The owner realized that he must either sell out or improve what he had. As it was, the ranch could not produce a family living. Improving the ranch would take money—credit. The owner could not finance it by himself.

The new Great Plains Conservation Program offered a possibility. The owner, already a cooperator with the middle Concho Soil and Water Conservation District, decided to participate and signed an agreement covering a 10-year plan.

Control of brush on 3,600 acres was essential before improvement of grass could be expected. After that, a full season of deferred use must follow.

Ranch returns show success of Great Plains Program

By H. L. Leithead and J. L. Richmond

Regional range conservationist and area conservationist, SCS, Fort Worth and San Angelo, Tex.

Range seeding would be needed on 1,959 acres, which included an old field and a pasture where machinery was used to root up the tree growth.

Grasses seeded were the strong, beef-building native species that covered the area before settlement days. Two seasons of rest followed to allow the seedlings to gain vigor and size.

For improved range management—fencing, 1,352 rods of it.

Next, water for the stock—a well and two ponds.

Coupled with these physical improvements, of course, was a conservation grazing system that included proper rates of stocking and rotation-deferred grazing.

Marked improvement

In 1967 another range evaluation on the ranch showed marked improvement: 1,130 acres in good and excellent condition; the rest, 3,148 acres, in fair to excellent condition. This was in spite of below-normal growing conditions 6 years out of the 10.

The evaluation rated the carrying capacity of the ranch at 257 animal units—an animal unit comprising a mother cow and calf or five sheep.

A signal improvement occurred in the performance of individual animals. Wether lambs bought in the fall of 1961 and sold in the spring of 1962 gained on the average only 4 pounds. In the winter of 1964-65 the same quality of lambs gained 13 pounds per head. In the 1966-67 winter season, lambs gained 23 pounds on the average.

The wool and mohair showed improvement also: 16,549 pounds in 1967 against 8,950 pounds from virtually the same number of animals 5 years earlier.

Costs and returns

In a cost-return analysis for the operation for the years 1961, 1965, and 1967, economists tallied the costs of applying the needed treatment under the Great Plains Conservation Program, amortized over 10 years at 6 percent to arrive at annual costs. Actual expenses for feed, taxes, and maintenance of improvements were taken from ranch records. Six percent interest was charged against the value of the livestock.

Here were the returns from land and management for 3 years:

	1961	1965	1967
	Dollars	Dollars	Dollars
Income	14,604	22,652	27,675
Expense	14,718	16,401	18,949
Net	(loss 114)	6,251	8,726

The range specialists pointed out that the increase in net returns came more from greater efficiency and a better performance per individual animal than from stocking rates.

The rancher was pleased with the results of his investment. He decided to keep the ranch, sure that under conservation management his range would continue to improve. ♦

Livestock production

	1962	1965	1967
Animal units grazed			
Cattle	0	40	47
Sheep	172	145	166
Goats	38	39	40
Total animal units	210	224	253
Meat sold			
Calves, pounds	0	15,162	11,840
Lambs, pounds	14,005	28,400	23,480
Yearlings (lambs), pounds	28,425	29,754	42,717
Total, pounds	42,430	73,316	78,037
Wool and mohair sold			
Wool, pounds	7,400	9,246	14,549
Mohair, pounds	1,550	1,680	2,000
Total, pounds	8,950	10,926	16,549

Some remember the dust and hardship...

Great Plains women face new prospect

Some have forgotten the wind and the dust of the 1930's in the Great Plains. Some have forgotten the courage it took to stay and do the grueling work of putting cover back on the runaway land.

Some have forgotten—but not the women who hung wet sheets over the windows and doors to keep out the suffocating dust.

Not the housewives who scooped the dirt out of their homes with shovels.

Not the wives who watched their husbands struggle year after dry year to grow enough food to keep their families alive.

Not the mothers who stood by helplessly and watched their children die of “black pneumonia” caused by the dust clogged air.

These are the women who today know, as well as their husbands, the importance of conservation on the Great Plains.

Conservation which, under the Great Plains Conservation Program, has given the ranchers and farmers of the region a practical and profitable way to prevent a recurrence of the Dirty Thirties.

A total program

It is a total program . . .

. . . to include cost-sharing, credit, and technical assistance in soil and water conservation.

. . . to keep the dust on the fields—out of their homes and their children's lungs.

. . . to make life easier for them and their families.

. . . to give the women time to be women!

These are the women who today, because of this program, have time for outside work, instructive clubs, productive hobbies. Modern conser-

vation farming practices and household conveniences have turned these women into the Great Plains counterparts of 5th Avenue.

By the time they are grandmothers, these women of the Great Plains no longer are wrinkled and old beyond their years.

One such young grandmother is Mrs. Dwight Finney of Simpson, Kans., mother of five and grandmother of 12. Although Dwight signed a Great Plains contract only a few months ago, he has been farming his 2,380 acres the conservation way for many years. Their farm-ranch operation already has six ponds, 2 miles of terraces, 8 acres of waterways, and 60 acres reseeded to native grasses. Future plans call for an additional 55,000 feet of terraces.

Her little factory

Charlotte still helps in the fields during harvest, but now she also has time to pursue her own interest in ceramics. Her “little factory,” begun 3 years ago in the basement, does a \$500 annual business in ashtrays, bowls, and figurines for friends, relatives, and grandchildren.

“I can hardly get anything else done,” Charlotte said. “All I want to do is ceramics.”

But, as is so characteristic of the Great Plains women, she does get other things done. She helps operate the citizen's band radio used as a fire warning system in the community. She has served as both president and vice president of the Extension Homemaker's unit in Simpson. She won bowling trophies during a tournament 4 years ago.

“I'm really not that good,” she said about her bowling. “We didn't



A husband-wife joint grain and hog operation keeps Mrs. Dixie Siler (above) busy feeding his grains to her hogs. Mrs. Jeanette Matousek (right) helps with silage harvest by driving the truck when needed.

have hired help that year, so I was working in the fields throwing hay bales around. We played nine straight games in that tourney. I won because I outlasted everyone else.”

Outlast and courage

And, perhaps, outlast is a word that describes many of the Great Plains farm and ranch wives. Outlast and courage!

Courage to outlast the dust. Courage to outlast the doubts and fears and to build again.



Mrs. Jeanette Matousek and her husband, Glen, of Cuba, Kans., have this kind of courage. Glen and Jeanette both remember the big blows of the 1930's. That's why they hesitated to buy high-priced farmland. Until 5 years ago they had been doing a lot of good conservation work—but on other people's land. Now they are applying conservation on their own 620 acres.

It was the Great Plains Conservation Program that finally convinced the Matouseks that land was a good

investment. They figured that conservation practices give the land resistance to drought and the other hazards of the 30's, and they were experienced in applying them. The new program offered them the opportunity to do the job quickly and with a sharing of the cost burden.

Today, one of their prize possessions is the farm pond which, among other things, is used for fishing by their three children.

Head bookkeeper for the John Bartholomew farming enterprise is

wife Tessie. They farm 773 acres in Jewell County, Kans., where like most central Kansas farmers, wheat is their main crop. Theirs is a Banker's Conservation Award Farm for 1966, honored by the Kansas Banker's Association.

On all his land

John not only practices conservation on his own land but also on the acres he rents. In fact, he does not rent land unless the owner agrees to sign a Great Plains contract to have conservation work done.

Tessie is one of the women who remembers when times were "not so good."

"We didn't have running water until we moved here 10 years ago," she said. "We didn't have electricity until Nancy started to kindergarten."

But, although these women now have time for clubs, hobbies, neighborhood get-togethers, the PTA, or work as 4-H leaders, they still lend a great deal to the farming and ranching operations of their husbands. Many drive the wheat or silage truck and run errands during harvest, in addition to doing the farmyard chores. Many also have livestock enterprises of their own.

Mrs. Dixie Siler and husband Carmen farm 1,200 acres near Minneapolis, Kans. Carmen is a grain farmer. He entered a Great Plains contract because "I knew it would save my soil, and that's what I wanted." Dixie, with the help of their four daughters, is the hog raiser in this joint grain and hog operation. She feeds *his* grain to *her* hogs.

Dixie markets around 500 pigs a year, either as top hogs in winter or feeder pigs in the summer. She has 32 sows, most of them Hampshires and has selected 35 gilts as replacements or additions for her hog "family."

Her kind of enthusiasm, together with the willingness to work hard and try new things, makes it easy to see why the life and the women of the Plains have blossomed from the dust of yesterday into the beauty of today and tomorrow. ♦

From floods to recreation

Would you trade a flood-plagued valley for a beautiful recreation area? People near Caldwell, in southeastern Ohio, did.

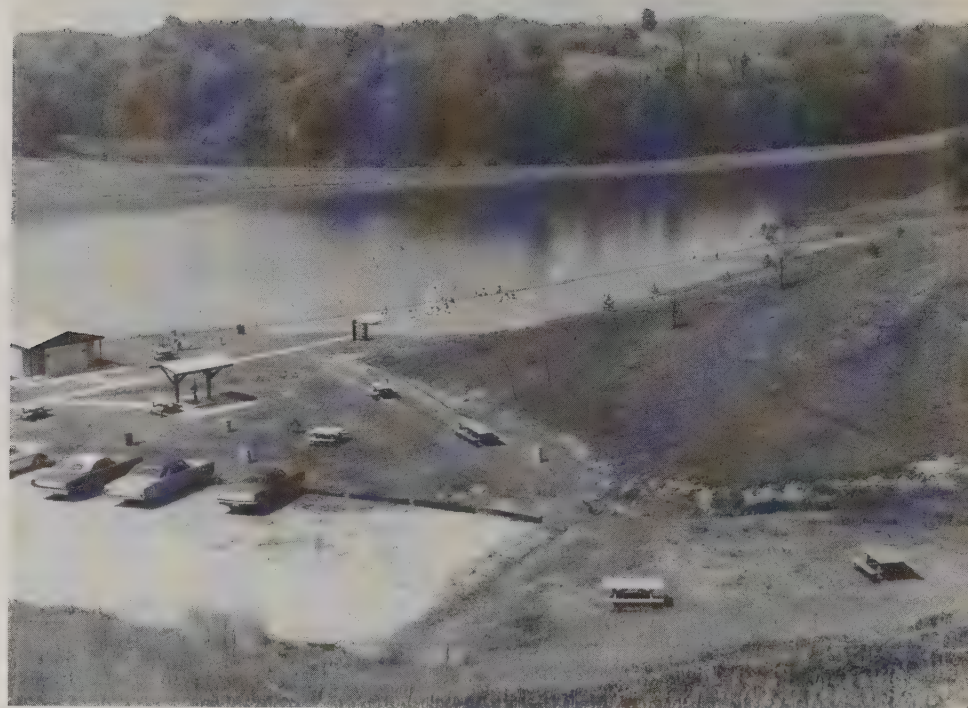
Steep hills and narrow valleys put the squeeze on tributaries of the 106-square-mile watershed drained by the West Fork of Duck Creek. Water crowding through silt-clogged channels swelled across several thousand acres in the 24-mile-long valley. More than once a year,

highways, businesses, industries and railroads, and rich farmland acres were inundated. In eight valley villages 75 percent of the people were directly affected. An average of \$79,000 in flood damages was being siphoned out of the valley's economy each year.

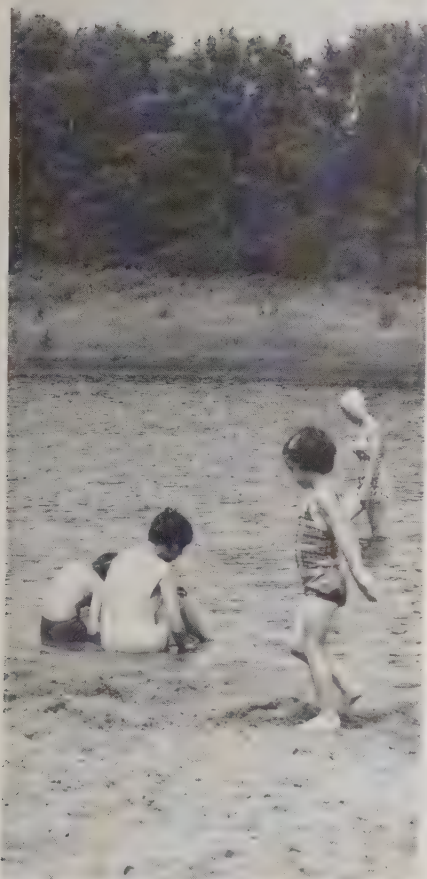
In 2 years' effort, the flooded valley was transformed into a camper's paradise. With the completion of flood-abating Wolf Run Lake, Ohio

Wolf Run Lake, part of a system giving the valley protection from floods, is the center of a new state park.

Before the watershed protection project, Duck Creek and its tributaries overran their banks several times a year. An extensive camping area (below) and bathing beaches (right) have been established around one of the lakes.



Shady campsites appeal to family groups at Wolf Run park.



developed one of the Midwest's most modern state parks.

The park contains 1,150 acres of scenic hill country overlooking the 220-acre lake. The lake alone is a \$500,000 multipurpose project preventing floods, supplying water and recreation.

The 174-site camping area was constructed as part of a Public Law 566 small watershed project with federal cost-sharing. The Ohio state government administered the contract and gave the project's multiple benefits a big boost by contributing \$328,000 for the camping area.

The new camping area is exquisite in rustic beauty. For people who like the camping atmosphere but do not care to "rough it all the way," a few of the comforts of home are provided. In addition to the trailer and tent sites, there are two modern wash-houses equipped with hot and cold showers and laundry facilities, a modern sewage treatment plant, modern toilet facilities, central

trailer dumping stations, liquid waste drains, and drinking fountains.

Instant popularity indicates the recreational facility will offer outdoor summer activities to more than 250,000 people annually.

The 220-acre impoundment furnishes almost everything to be desired in fishing, boating, and swimming. The public beach has ample parking space and modern change booths. Lifeguards are on duty during normal swimming hours.

A concrete boat landing ramp is available for boat enthusiasts.

The development of Wolf Run Lake and recreation area exemplifies local, state, and federal cooperation. The Ohio Department of Natural Resources, Muskingum Watershed Conservancy District, soil and water conservation districts, Noble County commissioners, and the villages of Caldwell and Belle Valley, with the assistance of the Soil Conservation Service, all joined forces in making the dream a reality. ♦



My Great Plains Conservation Program

By Frank Cimrhakl

Rancher, Roy, Mont.

In 1962 I signed a 5-year plan under the Great Plains Conservation Program to change from dry-land farming to livestock production. The contract was later extended 2 years as other practices were added to the plan.

To produce hay and pasture, the plan called for planting various grasses instead of wheat and barley on the marginal cropland. The purpose was to improve and increase the ranch grazing capacity.

My 9,000-acre ranch, about 10 miles northeast of Roy, Mont., is in an area of extremes in weather. As a cooperative observer for the U. S. Weather Bureau for 30 years, I have measured and recorded weather on my ranch. The 30-year average annual precipitation is 13.40 inches. Some years, the scant precipitation does not produce a satisfactory grain crop but does better in producing grasses and hay.

Uncertain water supply

Reservoirs were the main supply of water for my livestock. Usually the water in these reservoirs is low in the fall of the year and frozen during the winter. Cattle had to be moved from water-shortage areas that had adequate stands of grass to areas of enough water but often with inadequate grass. Now, this is all changed.

I started by planting some of my cropland to grass. Each year I planted grass until now I have converted 450 acres to pasture and hay.

Seedbed preparation by summer fallowing helped in establishing good grass stands. Grasses such as Russian wildrye, western wheatgrass, and green needlegrass were planted for pasture, while alfalfa, crested wheatgrass and alfalfa, and inter-

mediate wheatgrass and alfalfa were planted for hay. Excellent stands have been established. I still farm 200 acres and raise Horsford barley for hay or grain that I feed to cattle on the ranch.

Before the Great Plains contract, much of my rangeland was covered with a heavy stand of big sagebrush. To date, 1,020 acres of sagebrush has been sprayed by plane with 2-4,D. Deferment of this sprayed sagebrush range was practiced during the growing season from March 1 to November 1 for 2 years. With light grazing during the winter months, the grazing capacity of treated areas more than doubled. Some 400 acres of sagebrush range will be sprayed this year. No question about it, this conservation practice is worthwhile.

The highlight of my Great Plains conservation plan and contract was the drilling of two deep artesian wells 4 miles apart and constructing livestock water pipelines. One artesian well, 1,956 feet deep, flows at 80 gallons a minute and the other, 1,892 feet deep, produces 90 gallons a minute. Water pressure at each well is 80 pounds with a water temperature of 76°.

Wells and pipelines

I installed 5 miles of underground plastic pipelines, 1¼ and 1½ inches in diameter, that deliver water to 10 steel stockwater tanks 8 feet in diameter. These tanks provide water for livestock in 14 different pastures, and the running water never freezes in the wintertime. Some of the tanks, installed on fencelines with half of the tank on each side, serve two pastures.

I have noticed, as a result of this livestock watering system, that my

cows come through the winter in much better flesh on less feed. Weaned calves gain more where a good supply of warm artesian well water is available than where they have to drink from holes chopped through ice on frozen reservoirs. Thanks to the Great Plains Program, no more ice chopping for me.

The combination of conservation practices in my Great Plains plan has increased the grazing capacity of my ranch beyond the expected 70-head increase originally planned in 1962.

Permanent improvements

This year, the final year of my plan and contract, I will use up the balance of the federal cost-share allocated for my ranch. The conservation practices I have applied are of a permanent nature, and they will last much longer than the 7 contracted years.

All of this conservation work could not have been accomplished without the technical assistance furnished by the Soil Conservation Service assisting the Fergus County Soil and Water Conservation District, of which I am a cooperator.

The Great Plains Program led the way. It has done wonders. ♦

District subscribes to Soil Conservation

Directors of the Benzie Soil Conservation District, Beulah, Mich., report that since they are starting to receive *Soil Conservation* regularly on the official mailing list, the five paid subscriptions which they have kept up for many years now are being made available to five other people in their district.

Also for years the directors have provided subscriptions to the magazine for banks, some business places, schools, some cooperators, professional offices, hospital reading rooms, and county and town offices.

The magazine, the directors maintain, keeps them informed about the many facets of soil and water conservation activities. ♦



When owners of the Durham Meat Co. Ranch of Gillette, Wyo., were convinced that buffalo could be managed as easily as livestock, they began a program of good range management that has given new life to native grasses and a healthy new look to their rangelands.

The ranch cooperated with the Intermountain Soil and Water Conservation District under a Great Plains Conservation Program contract.

Cross fences and stock-water developments to distribute livestock were the first step in starting a rotation-deferred grazing system. In pastures where big sagebrush was a problem the brush was sprayed to reduce competition for moisture with desired grasses.

The rotation-deferred grazing system was designed with five pastures,

Buffalo respond like domestic stock to rotation-deferred grazing plan

By Charles C. McAfee

Range conservationist, SCS, Sheridan, Wyo.

each of about equal carrying capacity. Pastures used during the growing season 1 year are deferred during that period the following year and grazed in fall or winter. No pasture is grazed more than half of the growing season, and livestock are moved to another pasture when about half the current year's growth of key forage plants is grazed.

Grazing habits of buffalo seem to

be similar to those of domestic livestock and they adapt to the grazing system. In past years, pastures were larger and distribution of the animals was uneven. With smaller pastures, correct stocking rate, and adequate stock water, buffalo as well as cattle spread out over the range and graze the grass more uniformly.

Within the past 3 years the Durham Meat Company has completed most of its Great Plains conservation plan. The rotation-deferred system has greatly improved the range. Western wheatgrass, green needlegrass, and other productive native plants are coming back. There is grass available for all seasons of the year and soil and water loss is at a minimum. ♦

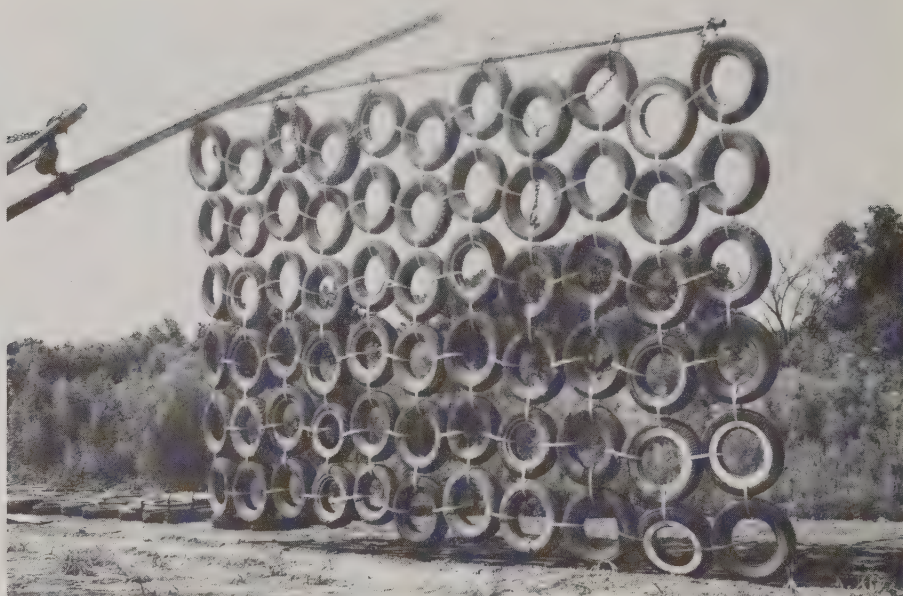


In large pastures, buffalo concentrate and overgraze the range in spots (above). The smaller pastures and rotation-deferred grazing system on the Durham Meat Co. Ranch brought marked improvement of grass in 3 years.

Old tires retread worn streambanks

By Edward J. Anderson

*Area land operations officer, U.S. Bureau of
Indian Affairs, Anadarko, Okla.*



A panel of tires, joined by galvanized steel bands, is ready to be lowered by an A-frame boom onto a streambank where anchors and support cable will hold it along the contour of the bank.

Used automobile tires, when secured as a protective mat against an eroding streambank, form a low-cost treatment for an expensive problem. The Bureau of Indian Affairs has used panels of tires in several locations near Anadarko, Okla.

Not only do the tires protect the streambank from flowing water, but after they collect silt and become

permanently embedded, the tires protect the roots of young trees planted to restore a vegetative cover.

Streambank erosion is a difficult conservation problem because erosion losses involve the more valuable bottom lands, and the riprap and other streambank-protection works are high cost practices usually reserved for off-the-farm use. A low

cost treatment for farm use would have wide application in many areas.

Costs of projects using 1,200 to 1,500 tires each have been computed at a few cents per square foot of treatment area. Tires are available in quantities at little or no cost from tire centers and recapping services. General Services Administration has made large quantities of tires from military bases available to the

Panels that included 1,400 tires were joined in this pilot project to stop the Washita River from eroding a bottom-land field. Locust trees were planted later for cover, and 1 year later the bank was stabilized (right). Many of the tires are already embedded in the sediment they have trapped.





Another use for tire mats. They control erosion at this pipe outflow by catching the water and forming a stilling basin.

Bureau of Indian Affairs at no cost. Handling and transportation charges are nominal. Used oil field cable, in good condition, is available at a great savings also and labor requirements are flexible.

Tire mats can also protect stilling basins below outflow pipes of drop-inlet structures.

Another possible use is for water-gap fencing at creek crossings. A

The tires are completely hidden by grass 2 years after they were installed.



tire net suspended from a taut cable would present a barrier that would be flexible to rising flows. Tires would necessarily be slashed or split to avoid trapping water and silt. Trial use is planned in connection with a channel-improvement project now under construction. ♦

Timber and space attract industry to RC&D area

Offering a choice of 13 attractive new industrial parks and a plentiful supply of hardwood timber, the Gwinnett County Resource Conservation and Development Project in Georgia was able to attract new jobs and create a market for a local resource by persuading a furniture manufacturing company to locate a plant within the area.

The Colonial Manufacturing Company was one of the first new industries to locate in the Lawrenceville Industrial Park. It employs about 125 people in making wood parts for dinette sets, deacon benches, chairs, and coffee tables. A dry kiln was installed to utilize the local hardwood timber.

Donald A. Reisman, president of Colonial, gave a number of reasons for the selection of the RC&D project area for the plant location.

"There's a plentiful supply of hardwood nearby and workers we can employ. But just as important, perhaps, is that this is such a desirable place for our people to live. There's plenty of land at a more reasonable price. We can have open space around our plant, and we don't feel boxed in on all sides."

Everything has gone so well since Colonial moved into Gwinnett County that already the company is thinking about plans for expansion.

"Now we ship the furniture parts to assembly plants in other locations," Reisman said. "We like this location so well that we plan to build our own assembly plant here."

Executives of industrial concerns moving into the project area have taken full advantage of available services to help them make the best use of their land. The assistance of conservationists of the Soil Conservation Service and the landscape architect of the Agricultural Extension Service are available in helping to control erosion and establish grass and shrubs on the plant grounds.

The Colonial Manufacturing Company is typical of the 29 new industries that have located in the industrial parks in the past 4 years. Collectively these industries represent an expenditure of about 31 million dollars and provide 2,900 new jobs.

New industry is only one facet of the total plan for the development of resources in the Gwinnett County RC&D Project. Other activities include land use planning for an orderly transition from a rural to an urban economy, development of recreation and wildlife areas, watershed protection and flood prevention projects, and woodland development.

All these activities, under the sponsorship of the Upper Ocmulgee River Soil and Water Conservation District and the Gwinnett County Commissioners, are creating a new and more prosperous and attractive community for the local citizens.—G. ROBERT PEEPLES, area conservationist, SCS, Decatur, Ga. ♦

Figures for Great Plains contracts

Some 32,352 contracts under the Great Plains Conservation Program had been signed as of December 31, 1968. The total cost-shared obligations amounted to \$113,734,270. Planned cropland conversions totaled 1,859,009 acres or 21 percent of the total cropland under contracts.

The cumulative expenditures amounted to about \$87 million, leaving a balance of \$27 million unpaid cost-share obligations. ♦

Many agencies join to assure farmers a water supply

A combination of agency assistance and local initiative brought farmers of the Palmer Creek area in Yamhill County, Oreg., an assured supply of irrigation water.

The Palmer Creek Water District Improvement Company, organized for the purpose, financed and built a pumping station on the Willamette River to lift water to the upper reaches of Palmer Creek. The creek channel carries the water to pumping sites for 51 farms that irrigate 3,250 acres.

Frank Armentrout, a grain, grass seed, and berry grower in the Palmer Creek area, led the formation of a farmer committee that engaged an engineering firm to prepare plans and cost estimates for the system.

When the committee provided this information the Agricultural Stabilization and Conservation Service approved cost-sharing the construction under a special Agricultural Conservation Program project.

The Yamhill Soil and Water Conservation District board of supervisors approved the company's application for technical assistance from the Soil Conservation Service.

The Farmers Home Administration negotiated a loan for the pumps, pump house, engineering, legal costs, and many other items not eligible for ACP cost-sharing.

Because of the economic importance to its merchants and people, the city of Dayton near the mouth of Palmer Creek gave the project enthusiastic support. The county commissioners of Yamhill County

also endorsed the special project.

Water rights were obtained on water stored in Corps of Engineers flood-control dams in the Willamette system.

The Water District Improvement Company contributed \$10,000, and the individual farmers paid a total of \$16,000 toward land acquisition and construction. The ASCS cost-share totaled \$53,000. The Farmers Home Administration loaned the company \$119,000.

The pumping station rises about 35 feet above the river. The station houses two vertical turbine pumps powered by 125-horsepower electric motors. Output of the pumps is 5,000 gallons per minute. There is space for equipment to provide an additional 10,000 gallons per minute when needed.

The annual operating and maintenance costs are estimated at \$5 per acre for the acreage signed up.

Member farmers can now plant crops with the assurance that water will be available throughout the growing season. This will increase both the quality and quantity of the crop grown.—FRELL ZINK, soil conservationist, SCS, McMinnville, Oreg. ♦

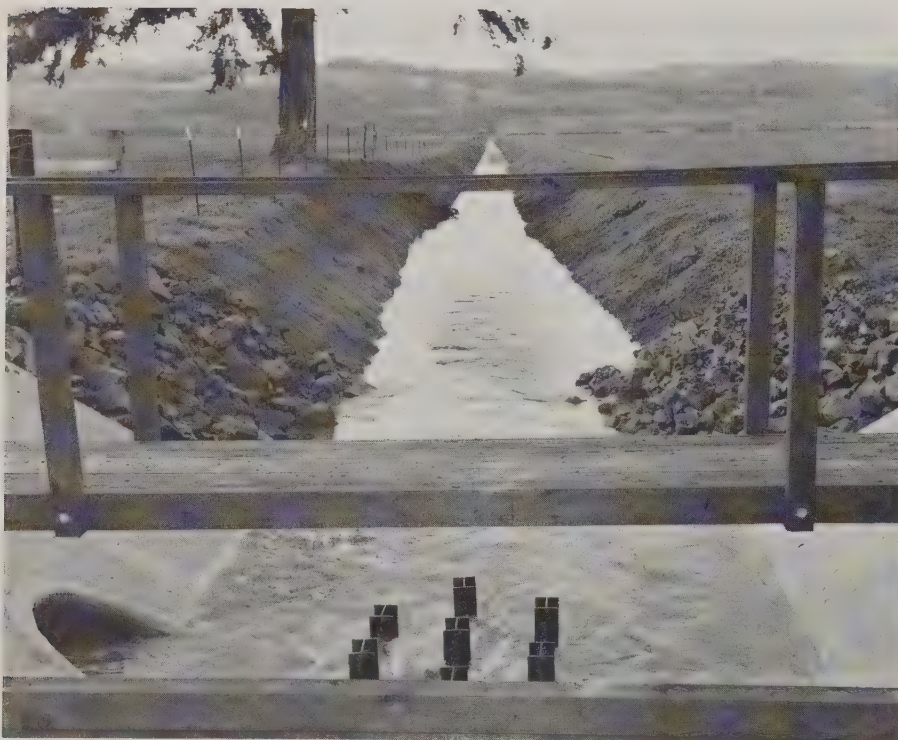
Bird watchers top record in count

Again this year between 10,000 and 15,000 amateur and professional ornithologists took part in the annual Christmas bird count sponsored by the National Audubon Society.

A bird-counting team in San Diego, Calif., topped all previous records for number of species seen in 1 day with a total of 217 that exceeded its own previous record, last year's all-time high of 209 species.

Some 22 different areas reported seeing more than 150 different species during the 1-day count. This continual increase in the variety of birds sighted doesn't mean there are more birds or a greater variety of birds; it means that there are more and better bird watchers, according to society officials. ♦

Willamette River water flows into Palmer Creek Water Improvement District system. In the distance the ditch turns to continue its course to Palmer Creek.



From hogs, cattle, pastures to golf greens



A nine-hole golf course replaces dairy cattle and hogs on the E. P. Staffs farm. The club house pictured was home of a hog herd.

From hog house to club house; from pastures to golf greens. These changes occurred on the farm of the E. P. Staffs, owners of the new Ramsey Lake Golf Course near Ramsey, Ill.

The golf course was a long-time ambition of the Staffs. It became a reality in 1966 when the Staffs and some friends started construction on the nine-hole course. It opened to the public early in 1967.

In developing their golf course plan, the Staffs requested assistance from the Fayette County Soil and Water Conservation District, as well as that of a friend, a golf course architect.

Many of the soil conservation practices already established on the Staff farmland were incorporated to make the course interesting and challenging to the golfer. These practices were useful in saving costs.

The farm pond became a beautiful hazard on three of the nine holes. The former pasture was converted to lush fairways with only one additional seeding and annual fertilization. Trees planted some years ago, by the local high school's Future Farmers of America class, also added to the challenges and beauty of the course. A spring, de-

veloped for livestock water, now irrigates the greens and tees.

Paint, plumbing, paneling, air conditioning, hard work, and imagination turned the old hog house into a modern pro-shop. Timber was thinned to make room for the back three holes of the course.

"Golf courses can be expensive," states Staff, "but we were able to get by with short cuts that saved thousands of dollars."

Staff gives much credit to his neighbors who used their farm equipment to help construct the greens and tees. Proper soil for greens is generally limited and costly for most golf course builders. Staff's keen knowledge of soils helped him locate the proper mixture of sand, silt, and clays in an adjoining bottom-land field, right on his own farm. The big job was to transport the necessary sandy loam soil to build the greens. Neighbors did this in a few short days with the earthmoving scoops many of them owned for constructing their conservation practices.

Staff says management and maintenance take nearly four full-time employees. At present this is no problem. Four of Staff's eight children live at home and share the work. Staff compares the time re-

quirements of the golf enterprise with that of dairy farming. "You must be there 14 hours a day, 7 days a week to make the thing go," he said.

Before venturing into this project, the Staffs studied the opportunities and hazards. They discussed plans with authorities on the subject.

The Farmers Home Administration assisted with a long-term loan, and Soil Conservation Service assisted in planning the recreational enterprise, designing of a new pond, and in rebuilding the existing pond to be used for a hazard.

The new pond brought ideas to the Staffs. Their recreation area lies close to Ramsey Lake State Park. Thousands of campers visit this park annually, many with children anxious for a place to swim. The Staffs' next project may be a public swimming area.

Providing outdoor recreation to the public is a new and challenging opportunity for the American farmer. Opportunities are many, but as Pete Staff points out, "Careful planning and study should precede the change from raising food for the public to providing outdoor recreation."—WILLIAM F. SCHALLER, *district conservationist, SCS, Vandalia, Ill.* ♦

Citrus grower cheers cover after rains

A heavy rain washed down between the new citrus trees of Hobe Groves Associates orchard near Stuart, Fla., causing heavy erosion damage in some areas but insignificant damage in others. It was apparent to Manager Thomas Gartland, a cooperator with the Martin Soil and Water Conservation District, that cover crops made the difference. He quickly decided to use cover crops.

Vegetative protection is essential for the expensive system of ditches, dikes, and beds needed for drainage and water control on citrus orchards. Twenty inches of rain in 1 month proved the drainage system could handle the water problem, but erosion between the rows caused damage to the water-disposal system and required costly repairs. No significant damage occurred where cover crops were established.

Millet, rye, oats, and bahiagrass are common crops on general farms in north Florida, and citrus growers are finding they can also be used as cover crops in south Florida orchards. Gartland uses browntop millet for a summer cover crop and oats for a winter cover. The cover crop is planted between the tree rows and in the water furrows.

For permanent cover, bahiagrass is seeded with the cover crop. Minimum tillage is used after the grass is established. This involves cultivating or using herbicides only in the area next to the trees.

The cost for the temporary and permanent cover is less than \$20 an acre, but Gartland feels it is worth it.

Gartland summed up his vegetative program by saying, "We just don't plant anything without a cover crop."—ROBERT M. CRAIG AND O. L. CASON, JR., agronomist and district conservationist, SCS, Gainesville and Stuart, Fla. ♦



Erosion is evident where soil is bare in a new citrus orchard (above). Protected areas were planted to millet for summer cover and bahiagrass as permanent cover. Grass used with minimum tillage (below) reduces soil erosion and damage to young trees from sand blasting. At bottom, Tom Gartland (left), manager of Hobe Grove Associates, Ltd., and O. L. Cason, SCS district conservationist, discuss oats cover crop seeded with Pensacola bahiagrass for permanent cover.



Watershed Congress seeks community action

"Watersheds — Framework for Community Action" is the theme of the 16th National Watershed Congress, to be held June 8-11 in Louisville, Ky.

The congress is sponsored by 27 leading national industrial, agricultural, civic, and conservation organizations. Its purpose is to serve as an annual forum for the discussion of ways to encourage, expedite, and broaden local watershed programs.

There will be panel discussions on identifying community needs and on governmental and private action in watershed programs.

Other features include a tour of the Valley Creek watershed in the famous Kentucky bluegrass country and Bernheim Forest, which includes a wildlife sanctuary, landscape arboretum, and nature center. A showing of outstanding new water films and an evening cruise on the Belle of Louisville, a paddle-wheel steamer, are also planned.

Worldwide conference to be held on arid lands

An international conference on "Arid Lands in a Changing World" will be held at the University of Arizona, Tucson, June 3-13. Sponsors are the Committee on Arid Lands of the American Association for the Advancement of Science, American Society of Range Management, United Nations Educational and Scientific Organization, International Geographical Union, Arid Zone Commission, and Arizona and New Mexico Academies of Science.

The objective of the conference is to stimulate interest in, and knowledge of, arid lands throughout the world through the exchange of knowledge among countries and between persons from different professional fields.

Field trips, of both short and

longer duration, will provide opportunity for firsthand observations of arid lands in North America.

Federal-State water officials to meet

The third annual conference of Federal and State Water Officials will take place in Salt Lake City, Utah, on June 23-25.

Attending will be state water officials who comprise the Interstate Conference on Water Problems and federal officials from those departments and agencies participating in the activities of the Water Resources Council.

The conference will be a working meeting to consider various technical and program matters in the water and related land-resource field of mutual concern to state and federal agencies.

Seedsmen's groups combine in annual convention

More than 600 seedsmen and representatives from Land-Grant universities, the Department of Agriculture, and allied industry are expected to attend the 86th annual convention of the American Seed Trade Association, June 15-18, in Denver, Colo.

In addition to many general ses-

sions and commodity group division meetings, several meetings of allied organizations are scheduled, including the annual meeting of the American Seed Research Foundation, National Council of Commercial Plant Breeders, and the All-American Selections Council. ASTA's Conservation Committee will meet on Saturday, June 14.

Dates and places

June 2-6, General Federation of Women's Clubs, Cleveland, Ohio

3-13, International Conference on Arid Lands, Tucson, Ariz.

8-11, 16th National Watershed Congress, Louisville, Ky.

15-18, Outdoor Writers Association of America, Inc., Duluth, Minn.

15-18, American Seed Trade Association, Denver, Colo.

22-26, American Institute of Architects, Chicago, Ill.

22-26, Air Pollution Control Association, New York, N.Y.

22-27, National Association of Sanitarians, Houston, Tex.

23-25, 3d National Conference of Federal and State Water Officials, Salt Lake City, Utah

23-27, Water Resources Council, Salt Lake City, Utah

26-29, Association of Consulting Foresters, West Dover, Wyo.

27-29, Western Association of State Fish and Game Commissioners, Teton, Wyo.

29-July 4, National Education Association, Philadelphia, Pa.

July

8-9, American Country Life Association, Stillwater, Okla.

8-10, Izaak Walton League of America, Cincinnati, Ohio

20-24, Business and Professional Women's Club, St. Louis, Mo.

26-30, American Association of Nurserymen, Inc., New York, N.Y.

27-30, National Association of County Government Officials, Portland, Ore.

31-Aug. 1, Great Plains Agricultural Council, Oklahoma City, Okla.

Forest fires decline

The number of forest fires started as a result of man's carelessness during 1968 dropped for the second year in a row, despite materially increased use of the national forests, according to the U.S. Forest Service. Man-caused fires numbered 4,900—some 200 under the 5-year average (1963 through 1967).

Total number of fires from all causes—lightning-caused as well as man-caused—was also notably below normal in 1968. ♦



"-- and man says pigeons 'fowl' up parks!"

KAB-4

Review



An Environment Fit for People.

BY RAYMOND F. DASMANN. 1968. *Public Affairs Committee, New York. Public Affairs Pamphlet 421. 28 pp. \$0.25.*

This little pamphlet states clearly and concisely the problem of environmental deterioration and the need for conservation in its broadest terms.

The concepts expressed are in such complete accord with the precepts and goals of the Soil Conservation Service that the agency has purchased and distributed a copy to every headquarters and field office in the country.

The author is a distinguished biologist and ecologist, presently director of environmental studies for The Conservation Foundation. The pamphlet summarizes the ideas discussed more fully in his book

Environmental Conservation, first published in 1959 and revised in 1968.

This is an explanation of human environment and conservation in terms of ecosystem ecology. Within this framework, soil erosion, sedimentation, water supply, and water quality—primary concerns of the Soil Conservation Service—are seen as parts of a larger whole.

Conservation is redefined as “the rational use of the environment to achieve the highest quality of living for mankind.”

Principal topics discussed are population and environment, air pollution, water pollution, solid wastes, urban open spaces, city planning, soil erosion, conservation of rangelands, forest conservation, wild creatures and wild places, and the marine environment.

This excellent statement in layman’s language should further popular understanding of the interrelatedness of conservation problems that SCS has long been seeking.—B.O.

New Publications

It’s Your World. 1969. U. S. Department of the Interior. 100 pp., illus. \$2. Fifth in the series of Conservation Yearbooks published by the U. S. Department of the Interior, this one focuses on the growing problems of the American environment, reporting agency by agency its efforts to do something about the problems.

One caption proclaims that “this is the grassroots conservation story,” that “grassroots are Nature’s numerous servants . . . Grassroots are among conservation’s most basic natural tools.” Another caption with a photograph of a beautiful stretch of stream asserts, “Conservation is one of the biggest jobs facing people today . . . As people act together to improve their habitat, they strengthen the quality of their entire natural world.”

The marine resource, wildlife and the endangered species, the land under supervision of the Bureau of Land Management, the recreation activities of the Park Service and the Bureau of Reclamation, the more recent operations of the Bureau of Outdoor Recreation—these and other programs of Interior dealing with our natural surroundings are given sympathetic treatment.

A final offering is a “recipe” for a clean, appealing environment, a checklist of goals (things to work for) and action (ways to do them).

Directory of Federal Recreation Entrance, Admission, and User Fee Areas. 1969. U. S. Dept. Int., Bureau of Outdoor Recreation. (28 pp.) List of areas to which “Operation Golden Eagle” applies in its final year. After March 1970, the Bureau of Outdoor Recreation’s Golden Eagle Passport will be discontinued and each agency will fix and collect its own fees.

Professional Workers in State Agricultural Experiment Stations and Other Cooperating State Institutions. Rev. 1969. USDA, Cooperative State Research Service. 280 pp. \$1.50.

What You Can Do About Water Pollution. Rev. 1968. U. S. Dept. Interior CWA-8. (6-page) illus., colored folder. \$0.15.

Public Assistance for Forest Landowners. 1968. USDA PA-893 (16-page) folder, illus. Supersedes PA-409, *Public Forestry Assistance for Small Woodlands*.

Protecting the Forests From Fire. BY U. S. FOREST SERVICE. Rev. 1969. USDA Agr. Inf. Bull. 130. 31 pp., illus. The problem; control methods and equipment.

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



America The Beautiful—Vermont

USDA SOIL CONSERVATION SERVICE
DAIRY COWS ON IMPROVED PASTURE, CALEDONIA COUNTY SOIL AND WATER CONSERVATION DISTRICT

Full-color lithograph prints suitable for framing—one for each state, Puerto Rico, and Virgin Islands—are available from the Superintendent of Documents for \$0.10 each or \$5 for set of 52. Obtain order blanks from your local SCS or post office.

From the Administrator:

Conservation in the Great Plains

The Great Plains has long been recognized by those who study it, work in it, and live in it, as an area separate and apart.

Its problems are those of a semiarid land, bounded on the West by the mountains which reduce its moisture allowance and on the East by an indefinite wavering north-south line where moisture begins to get a little better.

In retrospect it is evident that our principal lack was in understanding, a failing which we are well on our way to correcting.

In the 1941 Yearbook of Agriculture, an author noted: "In a desert you know what to expect of the climate and plan accordingly. The same is true of the humid regions. Men have been fooled by the semiarid regions because they are sometimes humid, sometimes desert, and sometimes a cross between the two."

This truth we now have realized.

Our answer to the problems of the Great Plains is to accept the common denominator, to base our use of the vast resources of the area as if the months ahead will be marked by drought or any of the other emergencies that people who live in the Plains have to come to expect and no longer fear.

Most of what we have learned in developing a sound agriculture in the Great Plains came to us through the year-after-year experience of the landowners who seemed to fare better than most through years of stress. Some of our learning, including our knowledge of the soils of the area, came to us through the efforts of the scientist and the research technician.

The sum of this technical and scientific know-how is a resource conservation pattern that insures a sound economy, with underneath a cushion against the coming of drought, wind, blizzard, insect devastation, or other emergency.

Given the forceful leadership of our soil and water conservation district boards, technical guidance promptly available from the Soil Conservation Service, and cost-sharing from federal funds to ease the burden of immediate

investment in conservation—this adds up to the Great Plains Conservation Program, now in its 11th year of active existence.

The 11 years of experience with the Great Plains Conservation Program has proved its value in the course of emergencies of short duration. There remains, of course, to see how the landowners who have invested in its offering come through the next severe drought such as has visited the Great Plains in cycles of roughly 20 years.

Those of us who have been involved in this program have no fear but that its effectiveness will be even more soundly proved.

It occurs to me, weighing the progress that has been made by the 12 to 15 thousand landowners who have successfully carried out their Great Plains Conservation Program plans, that we have established principles that other semiarid areas of the world may find worthwhile.

One-seventh of the earth's land resource is semiarid, the geographers tell us. Some of it is in Southeastern Europe, some in Asia, in Australia, in South America. Although not all of these lands suffered the damage that our Plains received from aggressive development in settlement times, most of them surely would benefit from our Great Plains experience. This will be especially so as these other lands feel the inevitable new pressures for increased production.

At any rate, those of our Soil Conservation Service field forces and others who have had a hand in the Great Plains Conservation Program can feel deep and justifiable satisfaction in a job well done.

Kenneth E. Grant

If your address changes, please notify us of your complete new address, including Zip Code number, and include old address with our code number as shown above.

A prize-winning picture story of range improvement



These three photographs tell the story of range improvement on the ranch of Gordon Sieh, Leola, S. Dak., as a result of his conservation plan under a Great Plains contract. They won the photo-story contest for Tom Pozarnsky, SCS range conservationist, Mobridge, S. Dak., at the 1969 annual meeting of the American Society of Range Management at Calgary, Canada.

1963. Overgrazed rangeland is heavily infested with weeds. In the photo are Dwayne Breyer, SCS, and ranchers Tom Boylan and Don Jarrett.

1966. As a result of controlled grazing and deferment, grass is replacing the weeds. Al Taylor, SCS, and ranch owner Gordon Sieh.

1968. The range is now predominantly grass. Tommy Nora, SCS, Gordon Sieh, and Merle Sherbourn, SCS. ♦



1.6 SO3S

JULY 1969

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soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES



MULTICOUNTY COMMUNITY DEVELOPMENT

Resource development districts A council of district governments A multicounty watershed project
A city's farm for resource learning Initiative by a county government

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: Melting snow in the mountains holds at once the promise of life and the threat of destruction to people in the valleys below. This scene is near Ketchum, Idaho.

Boundaries . . .

Conservationists and community leaders are finding that manmade boundaries can be bridged in economic development with beneficial results as impressive as in land treatment.

From among a growing number of examples of multicounty action, we report this month on two that successfully surmount a multiplicity of local governmental units and land ownership types.

In both the Wood River Area of Idaho (p. 267) and the Pecos Valley of New Mexico (p. 272), conservation districts, counties, municipalities, public land agencies, and private landowners have formed "resource development districts" to channel their efforts toward common goals.

In so doing, they extended to economic and social action a principle basic to conservation districts and watershed projects—that land-resource problems follow natural, not manmade, boundaries.

Self-help: Local leaders are learnings, too, that they can apply with their own resources the methods that have succeeded in projects aided by federal funds and guidance.

Albemarle County, Va., for example (p. 270), after learning the ways and rewards of a small watershed project, moved ahead on others without benefit of PL 566.

And the people of Wood River and Pecos Valley areas patterned their operations after federally supported RC&D projects without being designated as such.

soil conservation

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CLIFFORD M. HARDIN, Secretary of Agriculture

KENNETH E. GRANT, Administrator, Soil Conservation Service

BEN O. OSBORN, Editor

GEORGIE A. KELLER, Production Editor

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Irrigation farmers in the valleys prepare their land to husband water from the mountains in the background.

Irrigated crops are principal basis of the economy of the Wood River Area.



Multicounty planning

Four Idaho districts find mutual bond in resource problems

By R. Neil Sampson

Resource planning specialist, SCS, Boise, Idaho

Local resource development ideas have become regional in scope in the Wood River Resource Area of south-central Idaho since the beginning of the multicounty planning effort there.

Four soil conservation districts and the counties that compose them have banded together to deal with their mutual resource problems. Don Fredericksen of Gooding, chairman of the organization's steering committee, cites a recent application to the State Department of Reclamation for priority approval to start planning on a local watershed project as an example of the regional approach.

"We had a delegation of more than 20 people representing widely varied interests from all four counties to present the case for the East

Fork of the Big Wood River Project," he notes. "Ten years ago, the people of the watershed and the town of Hailey would have been on their own, but today they have regional support."

Fredericksen, who has served as chairman for the Gooding Soil Conservation District for many years, says the regional planning concept was started almost by accident.

"In 1966, the four district boards met jointly with the Soil Conservation Service to try to achieve a better balance of engineering assistance in the area. During the meeting, we not only worked out this situation but discovered how closely related most of our other resource problems were. It became apparent that we could do a lot more working together than we

could accomplish all alone.”

As a result of this meeting, the four boards agreed that they would begin meeting regularly to discuss mutual concerns. Lacking legal responsibility and finances to deal effectively with their problems, the supervisors turned to the county commissioners of the four counties for their participation in the joint effort.

Idaho has no legislation authorizing multicounty planning areas, so there was no support available from state or federal funds. The county commissioners supported the idea wholeheartedly, and the Wood River Resource Area was formed with a steering committee composed of two conservation district supervisors from each district and one commissioner from each county.

The region is one of contrast, stretching from the wild, mountainous background of Idaho's famed Sun Valley resort area to the arid desert land on the Snake River plain. The Big and Little Wood rivers spring up in the mountains and travel through the entire region, forming a common resource link. Water stored in the mountain snow-pack feeds these streams throughout the summer to irrigate the productive desert soils in the lower country. Along with contrast, however, the region also has many common problems.

Livestock production dominates the agriculture of the region, with most of the summer grazing located in Blaine and Camas counties and the bulk of the winter feed grown on the irrigated plains of Lincoln and Gooding counties. Water to irrigate the low country comes from Blaine and Camas counties and so does water that causes flooding somewhere in the region almost every year.

Recreation and tourism dominate the Hailey-Sun Valley area in Blaine County, but tourists pass through the other counties on their way in and out, creating regional needs for road systems, and region-wide opportunities for tourist attractions.



District supervisors and county commissioners make up the steering committee. Standing, left to right, are Glen Sorensen, Lincoln County commissioner; Dwight Osborne, Camas District supervisor; Bob Bolte, Gooding District supervisor; Don Fredericksen, Gooding District supervisor and steering committee chairman; Keith Justensen and Gordon Drage, Blaine District supervisors. Seated, Corwin Silva, Wood River District supervisor; Ben Clauner and Clyde Peterson, Gooding County commissioners; Lon Baldwin, Camas County commissioner; and Bill Hawkes, Gooding District supervisor.

Gooding County was the first to feel a need for comprehensive planning. The small town of Wendell made application to Farmers Home Administration for a sewer and water loan. FHA requested that this project be made part of an overall sewer and water plan for the county, so a planning effort was started under the chairmanship of Clyde Peterson, Gooding businessman.

The county commissioners realized the need to study more than sewer and water needs in the planning effort. They established 10 committees to consider different segments of the county's resources and report back to the commission. These committees included scores of local people, getting a wide spectrum of community interests directly involved in the planning job. Three conservation district supervisors, two city mayors, four local businessmen, and a state legislator made up the original chairmanship roster.

Planning efforts were organized as suggested by *Guidelines for County and Multicounty Planning*, published by the R. N. Irving

Chapter (Idaho) of the Soil Conservation Society of America. The committees studied agricultural, mineral, range, and water resources; public and semipublic improvements; economic base; people and population; government and finance; and recreation and wildlife.

“The importance of finding interested, civic-minded people to work on these committees cannot be stressed too strongly,” Peterson says. “There is a tremendous amount of information to be uncovered and assembled before any decision making can begin.”

In Gooding County, he noted, much of the information was found to be readily available through local records, state and federal agencies, and the like, but the big job was locating and organizing it.

“One of our first needs was information about soils, to base land use decisions upon,” he relates. “The old soil survey was inadequate, but through the cooperation of the Gooding Soil Conservation District and the Soil Conservation Service, a soil scientist developed general soil information that was useful for our

purpose.” This included a general soil map of the area and interpretive maps showing both potentials and limitations for using the soils for various purposes. Similar effort from the Farmers Home Administration, Agricultural Stabilization and Conservation Service, Bureau of Land Management, Extension Service, and the State Health Department resulted in assembling a total picture of the human and natural resources of the county.

As the planning study progressed, the committees soon realized that many of the major problems, such as flood control, water conservation, and transportation facilities, involved more than the one county. Using the organization of the Wood River Resources Area, they proposed the idea of multicounty planning to coordinate efforts on regional problems. Acceptance of the multicounty planning concept by the steering committee was immediate.

Today, individual county plans are rapidly nearing completion in all four counties. Planning work has been coordinated so that all re-

source data, maps, etc., match on the county boundaries. The WRRRA has established a planning committee under the steering committee to correlate and combine these efforts into an overall resource plan for the multicounty area.

What about the results of the planning to date and plans for the future? Clyde Peterson, recently elected Gooding county commissioner, says, “We’ve got the people thinking about the problems, how they might be solved, and recognizing some of the potential benefits to the area. We have seen some solid accomplishments which have given the people a spirit of optimism and confidence that they can solve many problems through joint effort. Perhaps most important, though, has been the dissolution of the old provincialism between the towns and counties of the region. We’re working in unison perhaps for the first time in the region.”

The steering committee has decided to apply for a Resource Conservation and Development Project. “This approach may pro-

vide us with the vehicle we need to accelerate our work,” Fredericksen says. “At present we are still a loose organization without real legal status as a multicounty body, but we feel we have the organization and the planning background to move into a Resource Conservation and Development Project very rapidly as much of the basic work is nearly complete.”

“Our biggest job at the moment,” he states, “is to get broader understanding of our planning work and development potential by all the citizens of the area. With the involvement of the district supervisors, commissioners, city officials, planning commission members and committees, and the Technical Action Panels from each county, we have a lot of people in the act right now. But we must keep all the people informed and involved so that we can move forward on the broadest possible base of local support.” ♦

Recreation area in the Upper Mississippi Region

A joint study that could lead to designation of a national recreation area in the Upper Mississippi River region, a 660-mile stretch of the river and adjoining bluff areas in the States of Minnesota, Wisconsin, Iowa, Illinois, and Missouri, is planned and will be completed in late 1970.

The U. S. Army Corps of Engineers and the Bureau of Outdoor Recreation, National Park Service, and Bureau of Sport Fisheries and Wildlife of the Department of the Interior will participate. Other Federal agencies and state and local governments will be asked to take part in the study.

Within the study area are 28 Corps of Engineers navigation pools with a water surface of 390,750 acres. Also included are the Upper Mississippi River Wildlife and Fish Refuge and the Mark Twain National Wildlife Refuge with a combined area of 224,693 acres. About 33 million people live within 250 miles of the study area ♦

High-producing irrigated pasture supports high-producing dairy herd in the Wood River Valley.



A county's own program for resource development

Virginia's historic Albemarle County liked its first watershed project and used it as a pattern for planned industrial growth

By Robert O. Anderson

District conservationist, SCS, Charlottesville, Va.

Thirty-five years ago, Albemarle County, Va., might not have appealed to a developer as a location to build homes or to a manufacturer as a place to establish a plant.

Its rolling farmlands were so badly eroded that the Ivy Creek watershed was chosen as the location for the second soil erosion control demonstration project in Virginia when the Soil Conservation Service was established in 1935. Local builders then used sand washed from the hills and deposited in the creek as a source of supply.

Since the late fifties, the story has been different. New homes and in-

dustrial plants have been established at a rapid rate. The county claims to be the fifth fastest growing area in the state. This has brought new demands on local government and people, which, by and large, are being well met by good planning and zoning.

The county administration and planning staff, working closely with the Thomas Jefferson Soil and Water Conservation District, have assisted industries in obtaining land, water, and other resources. They have financed developments in advance of growth. Realizing that urban and industrial expansion is inevitable, they are making sure that

it is accomplished in an orderly fashion. Farmers, cooperating with the conservation district, have been glad to establish practices that reduce erosion, beautify the rolling hills, and make their own enterprises more efficient.

The conversion had its beginnings in the erosion control demonstration and really got underway with the Beaver Creek Watershed Project in the early sixties. In the meantime, conservation practices established on the Ivy Creek watershed had cut off the builders' supply of sand from the creek.

Beaver Creek was one of the first projects in Virginia to be completed under Public Law 566. Its success set a pattern for further resource planning and development for the entire county.

A multiple-purpose watershed project, it included a 104-acre lake storing 750 million gallons of good quality water for public water supply and recreation in addition to providing flood prevention.

The county government sponsored the watershed project. It bought the land needed for flood

Beaver Creek Lake is constantly the object of local pride in Virginia's Albemarle County. The development inspired a conservation plan for the whole county.



These two plants, employing 2,400 people, are the largest customers of the county water system. The water comes from the Beaver Creek Watershed Project.

prevention and additional land for recreation use. The county shared 41 percent of the cost of the multi-purpose dam and built a \$536,760 filtration plant with 8,000 feet of pipeline. As a final item the county fenced the lake and recreation area at a cost of \$14,000.

Since then things have been happening.

A watershed study

The success of the Beaver Creek Project prompted the county government to consider further such developments. First, the county board of supervisors asked the Thomas Jefferson Soil and Water Conservation District for a complete study of the water and related land resources of the county. Soil Conservation Service people assigned to the district obtained Geological Survey topographic maps and outlined watershed boundaries and located potential damsites.

Preliminary data were developed, storage curves plotted, lake sizes measured, earthmoving estimated, and costs figured.

Information on the soil resources of the county was carefully gathered.

The county board studied the report, liked the picture it presented, and asked the Virginia Soil and Water Conservation Commission for help on a plan for developing county resources.

Action on their own

Area leaders and other interested citizens heard the plan explained and indicated approval. The county board then set up priorities for the watersheds where water need and the history of flood damages made action urgent.



Quickly, local enthusiasm for action on their own came from area citizens. Success of the Beaver Creek Project was a factor in the decision to go ahead with the overall plan.

The Earlysville Multiple Purpose Reservoir was the first project to follow. For it the county employed a private engineer, had surveys made, and obtained easements on land to be temporarily flooded. It paid \$64,909 for land that would be permanently flooded and for additional land for recreation. The earthfill dam cost \$297,574. A 51-acre lake storing 333,824,000 gallons of water became a reality.

The Virginia Department of Game and Inland Fisheries stocked the lake in 1967. The development will be used for flood prevention and recreation until needed for public water supply.

Development of the Totter Creek Multiple-Purpose Reservoir is underway. A filtration plant has been built, and the county is ready to start building the dam. The lake will supply water for the town of Scottsville and for the U.S. Rubber Company plant there. It will provide recreation for the residents of the Scottsville area.

The Priddy Creek Multiple-Purpose Project also is in progress. The

county paid \$95,000 for 565 acres. The project will include a 200-acre lake with over a billion gallons of water for flood prevention, water supply, and recreation.

One of the most desirable Multiple-Purpose Reservoir sites for water storage is in the Buck Island Creek, and the surrounding area is considered ideal for recreation uses. The county means to make full use of this potential and will buy the land as soon as finances will permit. The need for public water supply from this source is not urgent now.

People and markets

James B. Murray, general manager of Murray Manufacturing Corporation in Earlysville, explained why his firm chose Albemarle County for a location:

"Availability of good people and proximity to growing markets were among the reasons. With that decision, we went into the rural northwest part of the county, as close as possible to the labor supply. Many of our employees have been able to continue operation of small farms near their work, an avocation that goes a long way toward combating the boredom found in many factory jobs. We feel we have made an important contribution to the economy of this area."

Thomas M. Batchelor, county ex-

ecutor of Albemarle, gave his analysis of factors involved in the county's progress.

"We were fortunate in having leaders who recognized our fast growth and decided to plan for it. Our county's rich historical background, having the University of Virginia located within its boundaries, is attractive to many businesses and industries. The climate and the beauty of this area attracted many people to make their homes here. When the need for planning became evident, the Thomas Jefferson Soil and Water Conservation District asked the Soil Conservation Service for help in identifying the natural resources that could be developed for our further growth. The county has backed up our planning with appropriations on a continuing basis, realizing that planned development will enable us to control the direction of our growth."

The two industries using the most water from the new supplies are Morton's Frozen Foods and Acme Visible Records, Inc. Jointly they have more than 2,400 employees. Morton's, the largest water user, buys more than 175 million gallons a year from the county.

Thinking back to the Beaver Creek Project, a starting point, Board Chairman Edgar N. Garnett of Albemarle County summed up that achievement in this way:

"Beaver Creek is a real bargain for the county. It's like a vault built to conserve and to protect the valuable resources of our area." ♦

Prescription for self-help...

Pecos Valley conservation districts find there's a will and a way

By William H. Atkinson

Resource conservationist, SCS, Roswell, N. Mex.

Along a 150-mile stretch of the Pecos River Valley in New Mexico you find all the excitement and expectation that go with an area's all-out drive to yank itself from its economic sandtrap.

All the marks and trappings of the usual federally supported resource-development projects are in evidence. All, that is, except the authorized federal financial help.

The people of the Pecos Valley—including all of Eddy County, most of Chaves County, and portions of Lincoln and Otero counties—decided not to wait for the Federal Government to lend its helping hand. There was too much they could do without waiting.

Leadership—an essential ingredient for any such effort—was there in abundance. The six soil and water conservation districts serving the area (Macho, Roswell, Hagerman-Dexter, Central Valley, Penasco, and Carlsbad) promptly agreed to combine their energies and resources for action. Inventorying resources, identifying oppor-

tunity, developing a plan, marshaling forces—this was their kind of game.

The gathering of citizens for organization was on September 21, 1967, at the invitation of Oral C. Nichols, zone chairman for the New Mexico Association of Soil and Water Conservation Districts. Participants decided on "Pecos Valley Resource Development District" (PVRDD) for a name.

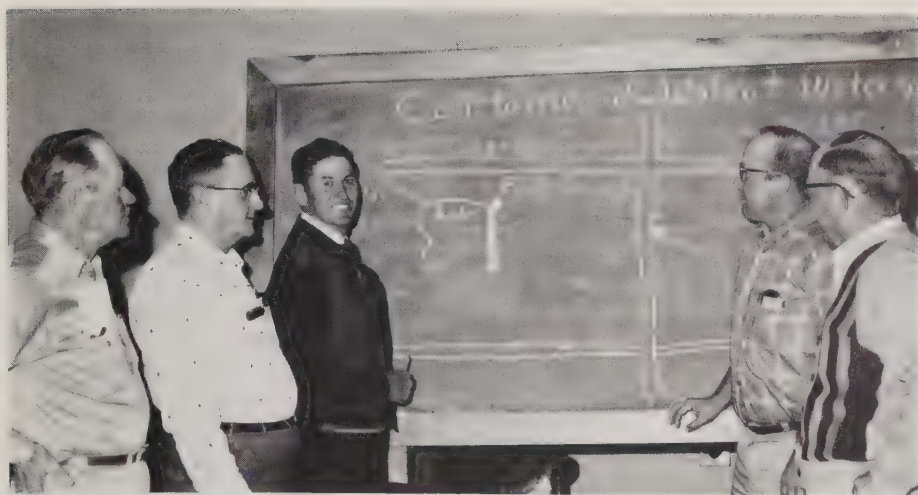
Chairman Kenneth U. Eakens of the newly formed district explained that if they had waited to get into action, 49 going measures for local improvement—expected eventually to involve \$33,713,250 and 865 man-years of work—could all still be in the idea stage.

They decided they could match the steps taken by the leaders of similar projects in New Mexico and other states, Eakens said. "The guidelines for Resource Conservation and Development projects have worked elsewhere, and we reasoned they would work for us," he added.

Eight major land ownerships or

Floodwaters at Cottonwood and Walnut Creek crossings come from drainage area in three conservation districts and two counties. That's why the districts decided to join forces in PVRDD.





Floods, that respect no property or fiscal boundaries, were in the thoughts of the group of leaders talking plans for the Cottonwood-Walnut Watershed Project. From left, they are J. J. Terry, director of the watershed district; Chairman Johnny Bowman of the Eddy County commissioners; Chairman Kenneth U. Eakens of the Pecos Valley Resource Development District; Chairman Don Meneffee of the Central Valley Soil and Water Conservation District; and Rosco Fletcher, Chaves County commissioner.

administering agencies were in the valley: Private ownership; New Mexico; the U.S. Department of Interior's Bureau of Land Management, National Park Service, Bureau of Reclamation, and Fish and Wildlife Service; U.S. Department of Defense; and the U.S. Department of Agriculture's Forest Service. Each ownership, with separate boundaries, was carrying on work within those boundaries.

With the organization of the PVRDD, land ownership boundaries vanished for practical purposes. Each agency had a representative on the district steering committee.

"With the free flow of information and coordination it is like a relay race," Eakens said. "One participant hands a project to another and it continues across all boundaries."

Water and watershed improvement were among urgent needs in the new district. Other needs and opportunities involved industrial development, recreation, tourism, job training, roads and highways, land use planning and zoning, water and air pollution abatement, processing and marketing facilities, and faster application of soil and water conservation.

Of the 49 projects which the district steering committee chose as objectives, seven have been completed. Others are moving rapidly ahead.

The New Mexico Interstate Stream Commission provided

\$156,423 for work in the Eagle Eddy County Flood District. A loan of \$227,000 came from the Farmers Home Administration for a new water system for the Atoka Community. Individuals and merchants donated \$2,450 to beautify highway medians in Roswell.

Conservation of irrigation water has been one of the most urgently needed improvements in the district. More than 60,000 acres of irrigation water management has been accomplished according to conservation standards since the district was formed, raising the new total of this conservation practice to 105,183 acres.

"It is hard to place a total value on a project such as this because water is so precious in our area," Eakens commented.

Cooperation has come from varied sources. The county commissioners, the agencies, and the various organizations have been eager to help. The Soil Conservation Service provided a full-time resource conservationist. Newspapers, radio, and television stations all helped.

This area has actively supported seven applications for assistance under the Small Watershed Program, Public Law 566. In response to the Eagle-Tumbleweed Draw watershed application the Eddy County commissioners authorized formation of the Eagle Eddy County Flood Control District. In

the Hackberry Draw watershed, which is now complete, the Eddy County Commissioners resurfaced a county road at a cost of \$16,000.

The city of Artesia, one of the sponsors of the Eagle Draw watershed, has assumed operations and maintenance responsibility for a part of the Cottonwood-Walnut Creeks watershed. In these projects easements, operations, and maintenance work by the city have a value of about \$100,000. Plans for improvement are being prepared on both of these watersheds.

Of the remaining four applications, the sponsors have completed all improvements in Zuber Draw watershed. Planned structures in Cass Draw watershed are under construction and Avalon-Alacran watershed has been authorized for operations, while North Spring River application remains unserved.

The state legislature has obligated \$400,000 for recreational development in the Cottonwood-Walnut watershed. The New Mexico State Park and Recreation Commission will take over operation and maintenance of the development.

The New Mexico Department of Game and Fish contributed \$200,000 to develop the game and fish phases of the recreation park.

The Pecos Valley Resource Development District is proof that multicounty planning and cooperation can open the way to get things done if willingness is there. ♦

California districts join to cope with change

By Thomas W. Holmes and Arthur W. Emerson

*District conservationist, SCS, and executive secretary,
Council of Bay Area Soil Conservation Districts, Concord, Calif.*

How do you assure good resource care in an area of 4½ million residents that will add nearly 3 million more residents in the next 20 years?

Coping with rapid land use changes and pressures is the aim of the Council of Bay Area Soil Conservation Districts formed last March by the 18 districts that border San Francisco Bay in California.

The council, made up of one director from each of the 18 districts, has adopted an annual work plan and a set of long-range plans and objectives. The long-range program says in part:

"The Bay Area is richly endowed with natural resources such as prime agricultural land, water, a Mediterranean climate, striking seashores, access to inland areas through the Bay, a landscape rich in esthetic beauty, a natural habitat for an abundance of wildlife, and a unique fishery.

"Rapid urban and industrial growth over the past and the predicted future has placed heavy demands on these existing resources. In order to assure that these resources are conserved, developed, and utilized for the maximum benefit of man, a cross section of all interests, capabilities, needs, desires, and problems must be recognized and accommodated."

The two decades following World War II saw millions of people coming to the 9-county Bay Area. Its population rose from 2 million in 1945 to 4.1 million in 1965. Industries moved in, and hundreds of

thousands of houses were built; the trend continues. Few cities or counties have been able to cope with the changes. Pressure on the land has been tremendous, and it has resulted in planning and development activities that were oriented largely to meeting problems of the commercial and urban sectors rather than considering land needs for food production. Even so, agriculture remains a strong part of the area economy, totaling some \$1,534,000,000 in 1968. Conservation district programs have contributed materially to keeping agriculture strong. Watershed projects under Public Law 566 have markedly reduced flooding and erosion on farmland and prevented millions of dollars in damages to industrial and urban areas.

A notable exception to urban-oriented planning was the Preliminary Regional Plan for the San Francisco Bay Area published by the Association of Bay Area Governments (ABAG), in November 1966. ABAG solicited comments from all Bay Area agencies including conservation districts.

What role for agriculture?

Thomas S. Vanasek, president of the Contra Costa District, and other district directors were concerned about the role of agriculture in the plan being prepared by ABAG. James Hickey, planning director for ABAG, was invited to explain the plan at a meeting of all Bay Area district directors in May 1966. After the meeting an informal group of directors was formed—with Vanasek

as acting chairman—to study the ABAG plan. The directors' comments were formalized and submitted to the association in January 1968.

During the study sessions the need became evident for an organization of districts that would act as the voice for resource conservation. The council was formed in March 1968, under authority of the Public Resources Code of the State of California. Fred L. Hector, a director of the Black Mountain Soil Conservation District, was elected president; three vice presidents and a secretary-treasurer serve with him as an executive committee. The council's board of directors is made up of one director from each of the 18 conservation districts.

The council's published plans are being distributed to all agencies and to many private groups including engineers, soil specialists, contractors, builders, public officials, and others.

To preserve open space

Primary goal of the council is to make a land use study aimed at preserving open space for agriculture and enhancing the environment through conservation of soil, water, and related natural resources.

A second objective is to study existing local ordinances and laws which directly affect agriculture land use and help prepare model ordinances, so that farmers and ranchers in the future would not be forced to comply with laws aimed primarily at subdivision developers.

Another important objective is that of getting acquainted. Conservation districts have always worked with other agencies and districts. All too often, however, the individual district has been bypassed when a broad plan is being considered or implemented, particularly if it extends beyond the individual district boundaries. The council will contact all conservation agencies and organizations and offer or request assistance, as the need dictates, in furthering resource conservation plan-

ning and accomplishments throughout the Bay Area.

Some recent activities include:

The council is seeking funds to further support selection, propagation, and testing of fire-retardant plants at the SCS Pleasanton Plant Materials Center. The council has a pledge of support and cooperation from the East Bay Municipal Utility District to carry out field demonstrations for fire-retardant plants.

The council has passed a resolution later concurred in by the California Association of Soil Conservation Districts at its annual convention to support Contra Costa Soil Conservation District in requesting a study on desalinization plants for San Joaquin Valley drainwaters.

Recognizing the value of public relations and daily attention to the council's affairs, the council has hired a former information officer for the Soil Conservation Service as executive secretary. President Fred Hector has met with SCS State Conservationist Thomas P. Helseth to discuss the possibilities of SCS assistance in technical staffing.

Arrangements are being made for publicity through established news media and educational releases through colleges and the county school systems. Diablo Valley College will print and use the council's long-range program as well as conservation farm plans and soil surveys in the college's natural science courses on conservation.

Dr. William Landis, science coordinator for the Contra Costa County superintendent of schools, has volunteered to assist in the educational phase. Through his efforts, space for a conservation section in the Contra Costa County Library has been arranged.

The council believes that unless the students of today are made aware of their natural environment and what they can and must do to conserve it for future generations, then what is done today is meaningless. And the Bay Area Council is dedicated to meaningful conservation action today and tomorrow. ♦

Multiagency team sponsors 3-county watershed project

By John Bolton and Erwin C. Ford

Watershed planning staff member and economist, SCS, Athens, Ga., and Washington, D. C.

In the South Fork of the Broad River Watershed Project in Georgia's northeast Piedmont section an unusual number of units of government are combining efforts with local citizens to develop the area to its full potential.

Three counties, two soil and water conservation districts, a municipality, and Georgia's highway department are sponsors. The counties are Clark, Madison, and Oglethorpe. Broad River and the Oconee River are the conservation districts, and the city is Lexington.

The 93,000-acre watershed is largely rural. Lexington has a population of around 400; nearby Athens, 42,000. The 825 farms in the area average 140 acres in size.

In developing a plan for their watershed, the sponsors had the help of the Soil Conservation Service and the Forest Service. In public meetings the local citizens took part in the planning process, helping to analyze costs, benefits, and adequacy of each proposal.

The county governments played an important role. The commissioners of the three counties worked closely with SCS engineers, economists, and conservationists. They obtained land rights. They pledged county resources in such work as roadside erosion control, assuming responsibility for altering roads, bridges, and culverts. They promised help as needed to Lexington officials in meeting obligations connected with adding municipal and industrial water to flood-prevention features of the plan.

Federal assistance for the project under Public Law 566 was authorized in September 1965 and work began. The dam on site 64 in Mad-

ison County now holds, in addition to its floodwater capacity, 135 acre-feet of water storage for supplemental irrigation. It protects valuable agricultural land as well as four county roads which periodically suffered in times of flooding.

A contract has been let for one of the dams designed for flood prevention, and the letting of contracts for other such structures is expected soon.

The Oglethorpe County Board pledged to Lexington that if the town could not finance completion of a filter plant and distribution system for its new water supply, the county will complete the job.

The Clarke, Madison, and Oglethorpe county boards are cooperating in roadbank stabilization, and the State Highway Department is helping with roadside erosion control and the alteration of fills, bridges, and culverts on state highways.

The dam on site 3 is the one on which the people of Lexington are resting hopes for growth. The 206 acre-feet of water for the town's use will make possible further industrial expansion. The Champion Paper Company, enthusiastic over the outlook, has deeded 67 acres of its land to the town and furnished easements for 99 additional acres.

The final plan for the South Fork of the Broad River Watershed Project represents a vast investment by local interests in effort and time. But with the plan now taking shape on the land, everyone in the watershed would agree that the effort has been sound from whatever standpoint you look at it—business, resource development, protection from floods, or simply making the area a better place to live. ♦

A farm is a fun place for learning

By Richard E. Watkins

District conservationist, SCS, Trotwood, Ohio

For many it's their first visit to a farm.

They are the children who came by the thousands each year to Aullwood Children's Farm on the outskirts of Dayton, Ohio.

Combined with the excitement of an outing and the thrill of seeing and touching real live animals is the wonder of learning about life in the countryside beyond the paved streets.

They come with their teachers, with Scout leaders, with parents, as teenage groups, and even as college classes to this model farm administered by the National Audubon Society as a center of learning about resource conservation.

A gift to conservation

The farm was purchased by Mrs. John Aull, Dayton conservationist, in 1961 and given to the Audubon Society. Immediately it was enrolled as a cooperator with the Montgomery Soil and Water Conservation District. A conservation plan was developed for the property with the assistance of the Soil Conservation Service. This plan detailed the land uses and conservation practices to be established. SCS followed through by providing technical assistance in doing the planned work.

Visitors have the opportunity to see many soil and water conservation practices. A diversion shows how to protect the buildings from water damage, and there is also a field diversion for water control. Contour stripcropping and grassed waterways have been established; living fences and wildlife habitat developed. Tree planting and pasture and hayland management practices are also to be seen.

More than 37,000 children and



adults visit the farm each year. Many of the students are from the Dayton and Montgomery County schools, but groups from other schools in a 70-mile radius also enjoy the farm. Boy and Cub Scouts, Girl Scouts and Brownies, Camp Fire Girls and Bluebirds, and other groups ranging from preschool through seniors in college, learn more about conservation here.

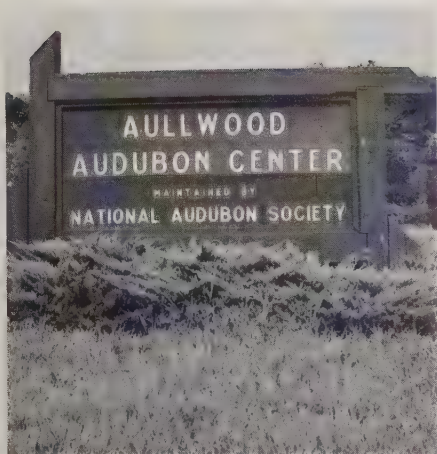
Aullwood Farm has a wide variety of lesson plans available for school classes on subjects ranging from names and uses of farm animals to beekeeping. There are displays and demonstrations on soil and water conservation practices. The SCS and the Montgomery Soil and Water Conservation District have provided bulletins and other educational materials to the farm throughout the years.

Teachers who make reservations in advance are sent preparatory material 2 weeks before they are due to arrive. Making a reservation 6 months to a year in advance assures a teacher that the class will be given a guided tour by trained instructors.

Due to the popularity of Aullwood, many classes have to visit as unguided groups. In this case, the teacher is given a tour guide folder that explains the farming operations and conservation practices. The teacher may then set the pace for the tour and choose the points to be stressed.

An operating farm

Although Aullwood is run as an operating farm, it is not entirely self-supporting. Many individuals and organizations in the Dayton



At left, a group of would-be farm boys study a model of the farmstead they have just toured. Below, an elementary school class makes a new acquaintance in the barnyard.



The Aullwood farmyard (above) is usually busy with touring groups (photo courtesy National Audubon Society). The sheep-shearing demonstrations (below) always draw attention.





One of the farm instructors (with shoulder patch) shows a school group the farm's purebred Shropshire ram.

area have contributed funds for such necessary things as a machine storage building, garage, classroom, a large display area, office space, and various farm implements. The Dayton Board of Education provides funds to help pay the farm instructors' salaries.

Corn, oats, wheat, and hay are the main crops produced at Aullwood. All grain is put in storage at a local feed mill and used as needed for livestock on the farm. The hay and straw are baled and stored for winter use.

Something new was added when the Aullwood Audubon Farm Gardeners were organized. This program is designed for boys and girls 9 to 13 years of age. Classes meet Saturday mornings from April 1 through September 1. Students work in pairs and are given a 12x12-foot garden plot to plant, maintain, and harvest. Each pair of gardeners is responsible for their own plot. Through the guidance of a farm instructor, the gardeners learn the principles of good gardening, proper preparation and care of the soil, seeding, weeding, cultivation, and

harvesting methods. The students also learn about garden friends and pests; the importance of good fertile soil and sound conservation practices.

One 11-acre area of the farm is maintained as a school forest. Each spring about 400 fifth grade students from a local school district plant their own Christmas trees, which they will harvest and sell when they are high school seniors. The farm furnishes trees, land, and tools, and shares in the returns.

And special events

Many special events are held at the farm each year. In late winter, "sugar bush days" are held. Then visitors may walk the woods and observe all the steps in making maple sirup.

Sheep shearing is usually in April, with demonstrations of the various steps in making cloth from raw wool. This includes shearing, spinning on an old-fashioned spinning wheel, and weaving on a hand loom. There is a display of how wool cloth is dyed with colors derived from native plants. In 1968,

1,600 people attended sheep shearing day.

A candle-making project in the fall gives families an opportunity to make their own hand-dipped holiday candles from beeswax. Approximately 4,000 people participated in this program in 1968.

A. James Helstern, chairman of the Montgomery Soil and Water Conservation District, says, "This type of conservation education makes learning fun." ♦

Septic system for commercial hog houses

To prevent objectionable odors and insects in commercial hog houses near urban areas, researchers at Purdue University, Lafayette, Ind., designed a septic system that was trouble-free and fully automatic.

Supported by a contract with USDA Agricultural Research Service, Dr. Hope W. Jones, Dr. Richard C. Dobson, and Alvin C. Dale built an experimental hog house. The waste-disposal system collected manure in a pit, piped it through a septic tank, and deposited it in a 40- by 40-foot pond.

The researchers monitored insect buildup closely by installing screens on the hog house and all around the pond and introduced a precounted number of fly larvae into the house and mosquito larvae into the pond as a potential source of insect infestation. Flies in the house died, only an occasional mosquito hatched from the pond, and odors were not objectionable. Even the water looked fairly clean.

Scaled-up versions of the system are now being designed for serving commercial hog houses. ♦

Sorghum brings new hope to Turkish farmers

By S. H. Fuchs and Atif Atilla

Plant materials specialist, SCS, and
agronomist, TOPRAKSU, Turkey

Field demonstrations on five farms in the Buyuk Menderes watershed in western Turkey convinced farmers that modern conservation farming and improved varieties of grain sorghum would increase yields, even under the difficult conditions of the Söke plains near the Aegean Sea.

In 1968 the methods installed under the direction of a team of specialists from the Soil Conservation Service more than doubled the yields of grain.

The demonstrations were under the auspices of TOPRAKSU, the Government of Turkey's farm irrigation and soil conservation agency. Technical support was provided under a working agreement arranged through the U.S. Agency for International Development.

A small amount of sorghum has been grown in the Söke plains for many years. It is a variety with white grain that grows to about 6 feet in height and yields little grain.

Continuous cotton has been grown for the past 25 to 30 years. Many of the fields are infected with Fusarium wilt. The crop is usually late, and the winter rains may begin before it is harvested. As a result, yields and quality both are low.

Previously, the plains region was in pasture.

The Söke plains have been built up by deposition of sediment by annual floods. For thousands of years sediment has accumulated at a rate of 1½ to 2 inches a year in the lower reaches of the flood plain. Thousands of acres which were part



Before planting sorghum, this field was irrigated after land leveling and listing. Farmers in this area had never seen irrigation like this before.

of the Aegean Sea during Alexander's time are now cropland.

The region is wet in the winter and very dry during spring, summer, and fall. Much of the land is still subject to annual flooding that makes expensive improvements impractical. High water tables and poor drainage add to the problems on many farms. Also, much of the worst-flooded area does not dry out early enough for planting before mid-June or later.

The soils have an extremely slow moisture intake rate because of the high silt content, low organic matter, and poor soil structure. Hardpans have developed. Salinity and alkalinity affect some of the soils.

The usual method of planting

sorghum here is to wait until the ground is dry on the surface. About 25 pounds an acre of sorghum seed is broadcast over the field and turned under with a moldboard plow to a depth of 6 to 7 inches. A heavy wooden drag, called a surgu, is pulled over the field to smooth and firm the soil. A disk harrow or cultipacker is sometimes used to break up the clods. If the seeds germinate, the young plants begin to appear in about 2 weeks.

Irrigation is done by hand-built borders forming small basins. Weed control, if any, is done with short-handled hoes. Ordinarily, no fertilizer is used.

Farmers were eager to cooperate with TOPRAKSU on the on-farm demonstrations in 1968. Both win-



The white sorghum field in the Söke plains in Turkey (left) produced only 3,000 pounds an acre. The building (right) was a two-story building 25 years ago. Today the lower floor lies buried in Buyuk Menderes silt.

ter-flooded fields and fields not subject to flooding were selected for the trials.

Several varieties of grain sorghum were obtained from United States seed companies. A lister was developed and used for seedbed preparation on three of the fields. Rows were spaced 3 feet apart and the lister beds dragged down with a surgu just before planting.

A planter was manufactured in a small shop in a nearby village to seed the sorghum at a rate of about 6 pounds an acre in 36-inch rows.

AID Equipment Specialist Marvin Parker developed a cultivator which cut weeds off to within a couple of inches of the sorghum plants. One farmer watching it operate said, "This machine in 1 day will do the work of 100 men with hoes."

Irrigation furrows were made by modified cultivator sweeps. Farmers watching the furrow irrigation on the leveled fields were awed by the siphon tubes, something they have never seen before. They could hardly believe their eyes when they saw a couple of men irrigating with ease. They were used to having a

dozen or more men struggling with small basins.

To the amazement of the farmers, good stands developed 5 days after planting.

On other fields, sorghum was planted in narrow-spaced rows. On one farm, following the June harvest of 60 bushels an acre of a Mexican variety of wheat, the straw was plowed under with a moldboard plow and the field bordered and preirrigated. The sorghum was planted on July 1 with a wheat drill with every other drop closed to avoid extremely close-spaced rows. The sorghum was up to a good stand 5 days later.

When the yields were measured, the farmers were impressed. Fields planted the conventional way did not do so well. The very best field of local white sorghum, fertilized with 50 pounds of nitrogen, made 3,000 pounds an acre. One of the United States varieties on the same farm produced up to 7,400 pounds of grain an acre. The demonstration field was planted in 36-inch rows and fertilized with 70 pounds of phosphate and 75 pounds of nitrogen an acre. Tevfik Goktepe,

who produced this high yield, said his costs for irrigating were reduced. He irrigated three times.

On Rifki Ozbasli's farm, one variety following wheat, bordered, pre-irrigated, and drilled in 14-inch rows, gave the highest yield of all—8,950 pounds an acre. Another variety in the same field produced 6,000 pounds an acre. The second variety produced 7,400 pounds an acre in 36-inch rows. Rifki used about 35 pounds of phosphate and 75 pounds of nitrogen an acre. He irrigated twice. He chopped out the weeds by hand once. The vigorous variety grew so rapidly that further weed control was not necessary.

Sorghum can be planted as late as July in the Aegean region with certainty that it will mature in the rainy season. This allows two crops, wheat and sorghum, to be grown the same year.

Farmers in the Buyuk Menderes are already figuring other ways to improve their yields. They have found that subsoiling land having a hardpan, more liberal use of fertilizers, and more timely application of irrigation water, are some of the ways to improve production. ♦

Treatment for a waterlogged golf course

The rain was over and the sky was clearing, but there was little relief for Karl Ostberg.

Greens Superintendent Ostberg of the Upper Montclair Country Club in Clifton, N.J., stood looking at the lake that covered much of fairways 1 and 9-east of the 27-hole course. During this wet summer of 1961, the high water was a familiar sight.

Other areas of the 192-acre course were water-covered, too, and in several places the grass was dying because of the constant seepage. Much of green 6-south had disappeared under water from a nearby pond that had overflowed.

At a recent New Jersey Golf Superintendent's meeting, Ostberg remembered talking with a fellow superintendent about his flooding problem. On his suggestion, he contacted the Northeast Jersey Soil Conservation District and soon the Upper Montclair Country Club was a district cooperator, with arrangements for technical assistance from the Soil Conservation Service.

Shortly after, SCS District Conservationist Harold C. Waters stopped to see Ostberg and look at the problem areas. What he saw convinced him that the major problem was with the main ditch intended to drain the flooded areas.

Running about 3,900 feet

through the center of the course, the ditch was too narrow and shallow to handle heavy rains. Also, culverts were too small to allow water through fast enough.

Channel improvement—deepening and widening—and replacement of two culverts with wooden foot bridges were suggested. The conservationist also recommended installation of nearly 9,000 feet of 4-inch tile lines under the fairways.

Club directors gave their approval and the work was done. The

sides of the ditch were sloped on a 1½ to 1 ratio and seeded with inoculated crownvetch and Kentucky 31 tall fescue. This mixture is effective in controlling bank erosion.

Beginning in 1962, New Jersey experienced 5 years of drought, and it remained for the wet summers of 1967 and 1968 to test the new water-control system. Happily, there was no duplication of the 1961 flooding, and Karl Ostberg expects to keep the golf course open right through future rainy seasons. ♦



From rain . . .

. . . to shine

Greens Mechanic Lee Kowal scratches his head over a rising lake on a rainy day in 1961. To left, the same spot in the summer of 1967.



City Boy Scouts learn and do in beautification-conservation project

“**B**eau-Con,” an abbreviation for Beautification-Conservation, is the password for Boy Scouts, Scout leaders, and Scout officials in the Akron, Ohio, area.

Beau-Con was initiated as a program to assist Akron area Boy Scouts in community beautification and soil conservation projects, explains Camp Director Jerry Ashwill.

“I like the program because I can do the work right here in my own neighborhood and my friends know that I helped on the job,” said one happy Scout.

Mayors, service directors, park officials, and Soil Conservation Service personnel were pleased when asked to suggest worthwhile projects that Scouts could do to provide community beautification. The SCS district conservationist cooperated in training and working with Scouts and Scout leaders.

A few typical projects were tree planting at Boy Scout Camps

Manatoc and Butler; installing erosion-control practices; cleaning river banks and streams in neighborhood communities; and tree thinning and pruning in local parks and on private properties.

In 1968, 145 troops with 2,610 Scouts participated in Beau-Con, to the extent of 14,876 hours of service. They were supervised by 359 leaders.

Present plans are to make Beau-Con a continuing project.—EARL P. CARLTON, *district conservationist, SCS, Cuyahoga Falls, Ohio.* ♦

South Dakota

Joint water system saves money for ranchers

Wilson and Mack Wyly, father and son, have adjoining ranches in South Dakota's Stanley County Soil Conservation District. Both have Forest Service permits to graze their stock on areas of the National Grasslands nearby.

In carrying out complete conservation ranch plans under the Great Plains Conservation Program, they agreed to a Soil Conservation Service suggestion that a single well, with a pipeline system, would supply enough water for both operations. The Forest Service joined in.

Other ranchers in the Stanley and adjoining Hughes soil and water conservation districts became interested in the idea and now are working together to solve their water problems.

The Wyllys say the 18-cents-an-acre cost of the water they are using is less than two-thirds of the cost of water had they built dams.—MAXWELL M. FINKE, *district conservationist, SCS, Pierre, S. Dak.*

North Carolina

Conservation farmer likes Ky-31 fescue

Ernest Teague, a long-time conservation farmer and supervisor of the Madison County Soil and Water Conservation District, N.C., is an enthusiastic advocate of Kentucky 31 fescuegrass for forage and erosion control.

He was one of the first farmers in Madison County to try the grass. Now he has 125 acres on his 275-



Scouts in Beau-Con Project get a lesson in tree planting from Camp Manatoc Ranger Andy Berry.



Crossfence and pipeline.



Mr. Teague and his Ky-31 fescue.



Rosenwald school ground after shaping and sodding.



acre beef cattle and tobacco farm near Marshall.

The secret of Teague's success with fescue is the kind of management he gives it. Following his conservation plan, he practices rotation grazing to allow each field to recover after being grazed or mowed. He also applies nitrogen fertilizer after the first cutting of hay.

Teague says one of the most interesting things he has noted about fescue is that cattle gain weight rapidly when grazing a pasture that has gone to seed. They eat the seed heads of the grass which are nearly equal to grain.

Teague served as supervisor of his conservation district from 1956 through 1964.—JULIUS M. BOGGS AND ORMAND C. WILLIAMS, *district conservationists, SCS, Marshall and Asheville, N.C.*

Nebraska

Range improvement heals wind-erosion areas

Improvement of grass and better distribution of livestock are healing some of the trouble spots on Neale Perrett's sandyland range near Valentine in the Cherry County Conservation District, Nebr.

A large blowout around one of the windmills is almost stabilized. A one-time badly overgrazed area at the south end of one pasture is now producing good forage. Another area that animals seldom grazed before is now properly used.

These changes are the result of range conservation practices in Perrett's Great Plains Conservation plan.

Following a study of range conditions on the 2,500-acre ranch with the aid of the SCS conservationist in 1963, Perrett changed from a cow-calf operation to grazing steers. The rancher and conservationist planned a grazing schedule that provided for moving the steers three times during the grazing season in a rotation pattern.

Five new fences were built to

subdivide the pastures, additional wells were installed, and old cropland was seeded to grass.

"I now run more animal units than before, and my range is getting better each year," Perrett says.—W. J. HOLMES, *district conservationist, SCS, Valentine, Nebr.*

Louisiana

Topsoil and grass improve a problem schoolyard

When Rosenwald High School in New Roads, La., was built in 1958 it was constructed on the only site available to the school board at that time—an old lumber yard and garbage dump on the outskirts of town.

The result was somewhat less than satisfactory, but finally the school grounds have been converted into a well-drained playground and athletic field adding a touch of beauty to the community.

Through cooperation with the Upper Delta Soil and Water Conservation District, the school obtained the assistance of the Soil Conservation Service in developing a plan to grade and drain the land.

The local National Guard Unit hauled the soil from a nearby farm. The parish police jury provided labor and equipment to grade and drain the area. In the fall of 1968 it was fertilized and planted to ryegrass. Bermudagrass will be planted to establish a good sod for the playgrounds.—RYAN J. JEANSONNE, *district conservationist, SCS, New Roads, La.*

Arkansas counties participate in RC&D Project

Five rural counties in northern Arkansas will participate in the Ozark Foothills Resource Conservation and Development Project to enable local people to use their own leadership, initiative, and ingenuity in creating new rural enterprises and jobs and speeding conservation work. USDA technical help and financial assistance have been authorized to carry forward the plan.

The Ozark Foothills Project includes Lawrence, Randolph, Sharp, Izard, and Fulton counties. ♦

Modern methods, agency help, make difference

Ten years ago Farmer Arson Victorian never dreamed that the modern changes in agriculture would enable him to operate his farm with such ease and efficiency.

Victorian raises rice and soybeans on his 160-acre farm in Allen Parish, La.

He started farming 23 years ago as a two-thirds share cropper on a leased 40-acre farm, raising cotton and rice. Following his first crop, he bought 60 acres of cropland and 20 acres of cutover woodland. Two years later he purchased another 40-acre tract.

In 1954 he became a cooperater with the Grand Coteau Ridge Soil and Water Conservation District. His first conservation work was a group drainage project in cooperation with his neighbors.

Next he cleared his cutover woodland and leveled his land.

Although land leveling is costly, it is paying off in increased crop yields, Victorian says.

Proper range use and careful grass management are coupled with the cost-share practices.

Victorian says loans from the Federal Land Bank and from the Farmers Home Administration enabled him to buy his land and farm equipment, dig an irrigation well, and construct his irrigation system.

With Soil Conservation Service engineering assistance, Arson Victorian selected a site for his irrigation well, built canals, and applied other needed conservation practices. The Agricultural Stabilization and Conservation Service cost-share payments helped him establish most of the conservation work.

Before he constructed his own irrigation system in 1964, he gave one-fifth of his rice crop as water



At a pause in field leveling operations, SCS Conservationist James Guillory helps Arson Victorian adjust the landplane.

rent. "My irrigation system will pay for itself in about 10 years," Victorian says. Better water management, better seed, fertilizer, and land preparation helped yields to climb.

Drainage of cropland has played an important role in his success story. The Bayou Blue Watershed Project recently completed a drainage lateral on his land. Previously, the field was hard to prepare and manage, and equipment often bogged at harvest time. Rice had to be replanted at least once in every 5 years because of excess water.

Victorian uses modern farm equipment—two large tractors, a combine, a landplane, and plows. He plans to buy a soybean planter and a big truck in a year or two.

There are many reasons why Arson Victorian is a successful farmer. Hard work, management, soil and water conservation, and agency help are among them.—JAMES G. GUILLORY, *district conservationist, SCS, Oberlin, La.* ♦

Works in Watersheds

The work in subwatersheds of the 11 authorized river basin flood-control projects and the pilot watershed projects of SCS has been successful not only because of its flood-prevention and watershed protection benefits. It has shown how to handle floodwaters on small

watersheds effectively and at low cost. It has served as a training ground for technical personnel. It has served as a proving ground for techniques that are being applied in the Public Law 566 program. ♦

How water feeds some birds

A farm or ranch with a pond, stream, or irrigation ditch supports the birds that feed almost exclusively on flying insects.

Many kinds of winged insects lay their eggs in water, the larvae grow to maturity beneath the surface, and then emerge as adults from the surface. This is why chuck-wills-widows, many flycatchers, gnatcatchers, kingbirds, purple martins, nighthawks, phoebes, swallows, and swifts are universally attracted to places that have running or impounded waters. Waxwings are also avid feeders on the winged insects, but they also feed heavily on fruits.

Even more numerous around bodies of water are the shorebirds, waterfowl, kingfishers, bald eagle, and osprey that find there their water-grown foods.

Water conservation on farms and ranches and in suburban areas supports millions of game and nongame birds.—VERNE E. DAVISON, *biologist, SCS, Portland, Oreg.* ♦

Auxiliary president aids conservation

When Mrs. Hugh Norman, Sr., of Summit, Miss., accepted the position of president of the newly organized Auxiliary of the Mississippi Association of Soil and Water Conservation District Commissioners in December 1965, she claimed little experience at organizing groups or in public speaking.

In the 3½ years of her tenure, the auxiliary has grown to a membership of 120, the second largest in the United States. Mrs. Norman is now vice president of the Southeastern Regional Area Auxiliary and a member of National Executive Committee.

As state president, Mrs. Norman has assisted the seven areas of the state to organize and plan program objectives. She provides guidance to area auxiliaries in planning programs and activities. She has traveled as much as 20,000 miles in 1 year in the interest of conservation, including attendance at regional and national meetings.

She is an active member of the Mississippi Conservation Education Advisory Council and also works at the county level visiting schools to promote conservation education and to distribute conservation materials.

Mrs. Norman was a member of the state committee which planned Soil Stewardship observances in 1968 and 1969. In addition to appearing on radio herself, she visited county radio stations in several counties and arranged for local auxiliary members to give programs.

Mrs. Norman has successfully kindled the interest of a number of women in soil and water conservation. In addition to wives of conservation district commissioners, women from other groups have joined with the auxiliary in working for conservation. Auxiliary members, in turn, meet with such groups as the Women's Cabinet of Public Affairs. At the 1967 fall meeting of

the cabinet in Jackson, attended by representatives from some 27 leading women's organizations in the state, the auxiliary was recognized as the group with the largest number of representatives present. ♦

Meetings . . .

Counties look ahead to the seventies

The National Association of Counties will hold its annual conference in Portland, Oreg., July 27-30, and its theme will be "Counties in the Seventies."

The conference program is designed to find ways to map a program to continue and expand the rapid revitalization of counties and to evaluate the impact of social change and technology.

Representing about 3,000 counties in the United States, the association is the leading organization in the field of county government. It is concerned with the development of rural as well as urban areas.

The association's policy statement, "The American County Platform," includes many subjects of interest to USDA, such as natural resources, forest lands, water resources, recreation, open spaces,

water and air pollution control, pesticides, county planning, multi-governmental areawide planning and zoning, and regional planning.

Rural growth is topic of rural life meeting

The 1969 annual meeting of the American Country Life Association will be held at Stillwater, Okla., July 8-9.

Emphasis of the program is to be on helping state and local leaders understand the dynamics of economic growth and human resource development in local rural America. Attention will be given to multicounty factors and to various aspects of the total community.

The presidential address will be given by Dr. R. J. Hildreth of the Farm Foundation, Chicago.

Great Plains Council on land retirement

Problems related to land retirement, low income, and the location of industry in the Great Plains will be among topics discussed at the meeting of the Great Plains Agricultural Council in Oklahoma City, Okla., July 31-August 1.

Chairman H. O. Kunkel of the council will call the session to order. He is dean and director of the Agricultural Experiment station at College Station, Tex.

Dates and places

July 8-9, American Country Life Association, Stillwater, Okla.

8-10, Izaak Walton League of America, Cincinnati, Ohio.

20-24, Business and Professional Women's Club, St. Louis, Mo.

26-30, American Association of Nurserymen, New York, N.Y.

27-30, National Association of Counties, Portland, Oreg.

31-Aug. 1, Great Plains Agricultural Council, Oklahoma City, Okla.

August

3-6, National Farm and Power Equipment Dealers Association, San Francisco, Calif.

10-13, Soil Conservation Society of America, Ft. Collins, Colo.

17-20, American Agricultural Economics Association, Lexington, Ky.

17-22, American Institute of Biological Sciences, Burlington, Vt.

22-23, The Nature Conservancy, Seattle, Wash.



"Litter-ally, man stinks!"

KAB-2

Review



Christians and the Good Earth.

BY VARIOUS AUTHORS. (1969). *The Faith-Man-Nature Group*, 800 S. Royal St., Alexandria, Va. 22314. 190 pp. \$1.25.

The 17 papers presented at the third annual conference of the Faith-Man-Nature Group held in November 1967 near Warrenton, Va., comprise the first of a projected series of publications by a nonsectarian group of scientists and theologians seeking to explore how the resources of theology can contribute to resource conservation.

The conference was made possible through the cooperation of The Conservation Foundation, the National Council of Churches, and gifts of several individuals. Its subject matter ranged from a history of the Soil Stewardship movement through the politics of conservation and the philosophical and theological positions of the Christian church's outlook toward resources and stewardship.

The role of the Church in conservation is discussed from many aspects in several of the papers. A proposal that the National Council of Churches create within itself a department of conservation to establish the church's position on conservation issues, keep church members informed on the issues of the day, and mobilize public opinion is discussed. The point is made that the Church, in addition to concerning itself with other critical social issues of our time, should approach environmental issues as well. The theme that environmental quality is as much a social and moral issue as poverty or crime in the streets is found throughout the book.

This book will make a valuable addition to many libraries. For the conservationist, it offers many ideas that will challenge, broaden, and strengthen his own philosophy on

stewardship. For the minister interested in exploring stewardship concepts with his congregation, it will provide a wealth of material for inclusion in sermons or discussions.

—R. NEIL SAMPSON, *resource planning specialist*, SCS, Boise, Idaho.

New publications

Catalog of Federal Domestic Assistance. 1969. *Compiled for the Executive Office of the President by the Office of Economic Opportunity.* 610 pp. A description of the Federal Government's domestic programs, specifies major eligibility requirements, tells where to apply, and lists printed materials available. Supersedes *Catalog of Federal Assistance Programs*, 1967.

Wood Decay in Houses, How to Prevent and Control It. BY U. S. FOREST SERVICE. Rev. 1969. *USDA Home and Garden Bull.* 73. 17 pp., illus. \$0.15. Supersedes *Farmers' Bulletin* 1993, *Decay and Termite Damage in Houses*.

Sanitary Landfill: a Bibliography. BY R. L. STEINER AND RENEE KANTZ. 1968. *U. S. Dept. Health, Educ., and Welfare, Public Health Service Publ.* 1819. 37 pp.

The Demand and Price Situation for Forest Products 1968-69. BY DWIGHT HAIR AND ALICE H. ULRICH. 1969. *USDA Misc. Publ.* 1086. 74 pp., charts. Data of interest in relation to the rising lumber prices.

Conservation Highlights 1968. 1969. *USDA Soil Conservation Service.* 6 pp. folder. Digest of the progress report of the Soil Conservation Service for the fiscal year 1968.

The Soil Conservation Service. 1969. *USDA Soil Conservation Service SCS-CI-17.* 4 pp. Superseding SCS-CI-3, outlines the functions of the SCS.

Soil surveys

Major County, Oklahoma. BY FERRIS P. ALLGOOD. 1968. 84 pp., illus.; maps 3.17 inches to the mile (1:20,000). Fieldwork by Ferris P. Allgood, Arlin J. Conradi, Clifford E. Rhoads, and R. D. Brinlee.

Howard County, Texas. BY HERBERT R. STONER, W. D. MITCHELL, K. G. BROCK, H. E. MITCHELL. 1969. 68 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Genesee County, New York. BY JOHN P. WULFORST, WILLIAM A. WERTZ, AND RICHARD P. LEONARD. 179 pp., illus.; maps 4 inches to the mile (1:15,840).

AMERICA THE BEAUTIFUL LITHOGRAPHS



America The Beautiful—Massachusetts

BEEF CATTLE ON IMPROVED PASTURE, BERKSHIRE CONSERVATION DISTRICT

USDA SOIL CONSERVATION SERVICE

Full-color lithograph prints suitable for framing—one for each state, Puerto Rico, and Virgin Islands—are available from the Superintendent of Documents for \$0.10 each or \$5 for set of 52. Obtain order blanks from your local SCS or post office.

Multicounty land use planning

The rapid growth of this country can be guided to preserve the wholesome qualities of both town and country if urban and rural people join together in community planning.

Citizens are beginning to demand that their elected officials at all levels plan for a future that includes adequate amounts of clean air, wholesome food, and pure water, along with adequate space to live, work, and play in a satisfying environment. Recent sampling of public opinion shows that people are willing to pay more taxes for improving and maintaining the quality of their natural surroundings.

State, county, city, village, and town governments recognize that these basic necessities of the good life do not just happen, but must be planned, programed, financed, and carried out through citizen involvement and support.

For example, the National Association of Counties in its official policy statement, "The American County Platform," says that the responsible use of the Nation's natural resources is an obligation shared by citizens, private enterprise, and government at all levels, and that county governments have a critical role and responsibility for providing local leadership in the wise utilization and conservation of our country's natural resources.

The association recommends that each county, as an integral part of its planning program, include a consideration of its natural resource needs and opportunities, including water, power, forests, minerals, soil, air, open spaces, fish and wildlife, and outdoor recreation resources.

The solutions to land use problems and the opportunities to prevent future land use mistakes do not stop at individual property, town, county, or even state lines. More and more we see counties and cities joining together to work on areawide comprehensive planning. It is national policy that boundaries for planning and development districts helped by the Federal Government should be consistent with established state planning districts and regions, unless there is clear justification for exception.

Decisions that influence the use, development, and care of a given parcel of land are being made by planning commissions, councils of government, and other public bodies farther away from the individual tract of ground. The pattern and intensity of land use is named in the Intergovernmental Cooperation Act of 1968 (Public Law 90-577) as one of the guides needed for governmental policies and actions as a part of comprehensive planning directly related to area needs.

The Soil Conservation Service has—or with proper funding can obtain in cooperation with local soil and water conservation districts—the basic facts relating to land and water resources needed by those who make the land use decisions.

We must be sure that the extent of our available help, such as soil, water, and plant data, interpretations, inventories, technical assistance, and knowledge of the resources of the area being planned, are known to and understood by those local, areawide, and state officials involved in comprehensive planning efforts.

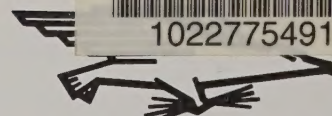
It is not enough simply to furnish the raw soil and water resource data. SCS has a responsibility to help local governments find ways and means of using the data to achieve their land use goals. This may mean helping them use this information as a basis for zoning, for health and sediment-control ordinances, or for building codes which relate directly to the suitability or limitations of the resource base.

Conservation district leaders and SCS personnel are establishing continuous working relations with county and city governments and their elected and appointed boards and commissions charged with these responsibilities. This relationship should help in arriving at wise land use decisions and avoiding the tragedy of rural and urban people being engulfed by each other's land use mistakes.

Kenneth E. Grant



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Windbreaks and cover crops in cotton country

Windbreaks and cover crops, commonplace in the Great Plains, are being transplanted to the South Carolina community of Hebron to cope with an increasing wind-erosion problem.

In the mule-and-plow days, Hebron was noted for its fine farming. Six ponds in the community turned water wheels to gin cotton and grind corn.

Mechanized farming and larger fields eliminated the patchwork of woodlands that broke the force of spring winds. More efficient tillage reduced the residues of grasses once left between the cotton rows.

Now most of the ponds are filled with sand. Open drainage ditches, necessary for farming low wet soils, are frequently blocked. Sand piles are prominent along woods edges and roadbanks.

The Marlboro Soil and Water Conservation District supervisors initiated a communitywide wind-break and erosion-control plan. The county agricultural agencies endorsed the idea. At a meeting the Hebron farmers voted unanimously to carry out the plan.

Under the plan some 40,000 pine seedlings were planted in rows along roads and boundary lines of the 3,500-acre area. Nearly all rows were planted at right angles to the prevailing wind. Many farmers



SCS Conservationist Clarence Helms observes 3½-foot bank of sand. At right R. L. Blackwell measures pine seedlings planted in Hebron for wind protection.



planted strips of grain or other close growing crops between the row crops to protect young trees and to further reduce wind-erosion damage. In some fields, crop residues were left to protect the trees.

Each farmer planted his own windbreaks. Renters planted windbreaks for absentee landowners. Pine seedlings were donated by E. D. Pew Timber Company, Canal Wood Corporation, South Carolina

Industries, International Paper Company, West Virginia Pulp and Paper Company, and Catawba Paper Company.

Hebron was known for its good crops in the 1920's. When these trees grow big enough to provide protection from the wind, that reputation can be regained by the community.—B. W. ANDERSON, *district conservationist, SCS, Bennettsville, S.C.* ♦